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Original Communications

FURTHER OBSERVATIONS ON THE HEPATIC LESION IN ECLAMPSIA*

BY WILLIAM J. DIECKMANN, B.S., M.D., ST. LOUIS, MISSOURI

*(From the Department of Obstetrics and Gynecology, Washington University School
of Medicine and the Saint Louis Maternity Hospital)*

IN CONSIDERING various factors which may be involved in the production of the clinical condition which we designate eclampsia, our attention has been focused on the lesion which is found in the liver of many patients dying of this disease. This lesion is chiefly a peripheral hemorrhage associated with necrosis and a process which has not been demonstrated in any other condition but in eclampsia. It is pointed out clearly in the literature that these changes are not necessarily present in the liver in every case but most reports show that they are present in a very considerable majority of cases. We do not wish to create the impression that the hepatic lesion is the most important phase of clinical eclampsia but rather that it is a specific one and its importance in the disease can only be expressed after other phases of eclampsia are better explained.

Fahr summarizes the changes in the liver in eclampsia briefly as follows: Localized changes are found in the periphery of the lobule and fibrin thrombi in the portal capillaries. This condition in the capillaries leads to the production of large blood spaces and hemorrhages which bring about necrosis of the liver tissue involved, chiefly by pressure. In view of this fact and also of the fact that in eclampsia thrombosis in other parts of the body is not nearly so frequent as it is in the liver, conditions must exist there which favor coagulation in the portal capillaries.

*Read at a meeting of the New York Obstetrical Society, May 14, 1929.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

In a previous paper we have discussed possible ways in which this coagulation might take place. In the first place portions of placental tissue are constantly entering the maternal blood stream. This is more marked in the latter weeks of pregnancy at the time eclampsia is most likely to develop. This tissue, being whole protein and, as we have demonstrated, high in tissue fibrinogen, might not only cause some shortening of the coagulation time but also might be considered a factor in producing the increased fibrinogen content of the blood occurring in late pregnancy and more particularly in eclampsia. To bring about neutralization or digestion of these elements which are continually entering the blood stream a certain amount of neutralizing substances

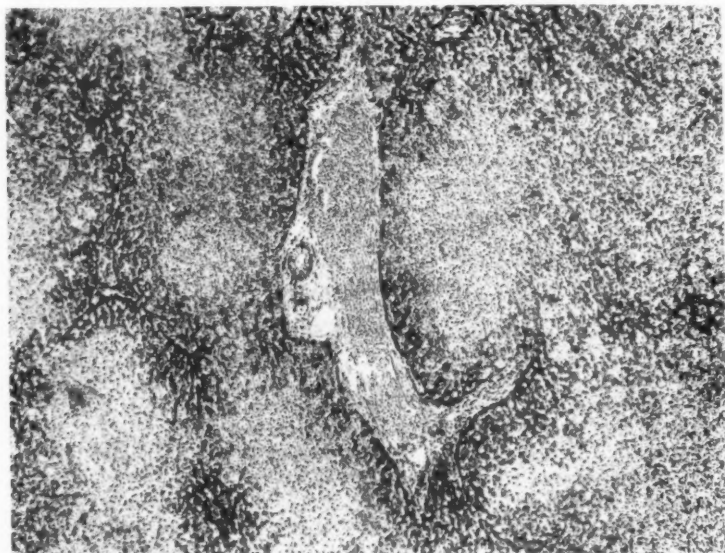


Fig. 1.—Dog 67. In the center of the picture is seen a portal space entirely surrounded by hemorrhage and beginning necrosis. This lesion was very extensive and one meat protein meal and one injection of tissue fibrinogen (lung extract) caused the death of the dog in convulsions four hours later.

or ferments of the blood must be called upon to do this work. Further it has been shown by Mills, whose work I quoted in detail in a previous paper, that so-called tissue fibrinogen when given by mouth has a marked effect on shortening the coagulation time and can even be demonstrated unchanged in the urine. Mills has also shown that there is in the human a marked shortening of coagulation time following the ingestion of a meal rich in meat protein. This work of Mills suggested to us that in pregnancy there is perhaps an increased permeability of the intestinal wall just as there is increased permeability in other tissues of the body during this time. Under these conditions larger protein molecules than the amino-acid derivatives could be absorbed and become concentrated in the portal circulation. This point interested us further when

we recalled the fact that if certain precautions were taken in the latter months of pregnancy, eclampsia seldom develops. These precautions consist of the elimination of meat proteins from the diet, effective daily evacuations of the bowels, and the intake of a considerable amount of fluid.

When one considers the high blood pressure which is practically always present in cases of eclampsia and recalls the marked changes in the capillary circulation which have been observed by numerous investigators, it is logical to assume that some pressor substance or substances are at work. What the nature and source of this substance or substances may be has been a point of much discussion and considerable

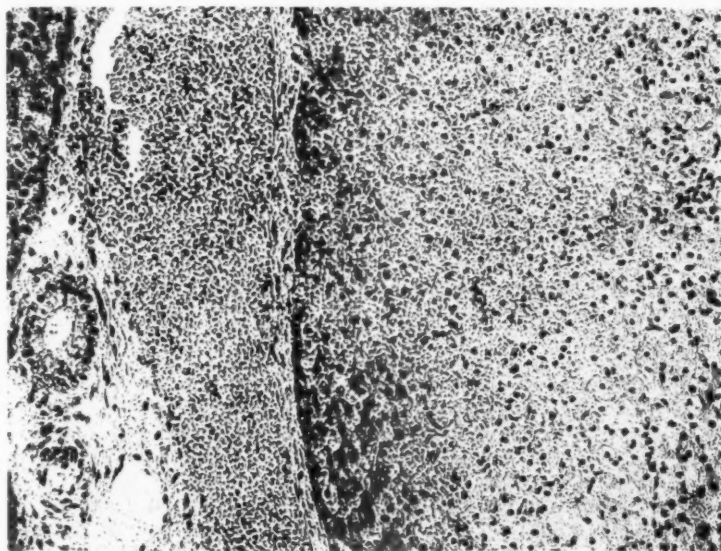


Fig. 2.—Dog 67. Higher power of Fig. 1. Shows branch of portal vein and bile duct. Just a small strand of normal liver cells remains to right of vein.

investigation. It is logical to assume that no one source is responsible for the presence of such substances. That the intestinal tract may be a source is a logical deduction from the fact that in intestinal putrefaction amines are formed which if absorbed could act as pressor substances. This may be a group of amines and not any particular isolated one. The placenta could be regarded as another source, the degenerative lesions there could be considered as well as the normal structures which enter the blood stream almost constantly. A damaged liver may also be considered as a source which may result directly in releasing additional pressor substances and also may lead to a diminution of the formation of antithrombin thereby further shortening coagulation. Probably all these sources and under rarer circumstances even others could be considered; in the one case, one may be the most predominant

factor, and in another case, another. Our attention has been called recently to the work of Johnson, Johnston and Nichols. These investigators feel that an increased tyramin content of the blood may be a factor in the production of eclampsia. From their conclusion they emphasize the placenta as the chief source of this material. As we have stated we have long been aware of the fact that substances of this kind may be at work in eclampsia, but we repeat that these substances are most likely not from any specific substance or from one particular source. With a concentration of blood resulting from the action of such pressor substances, the increased concentration of the products in the portal system due to the absorption from the intestinal tract, and with the usual neutralizing substances working against the ever-entering

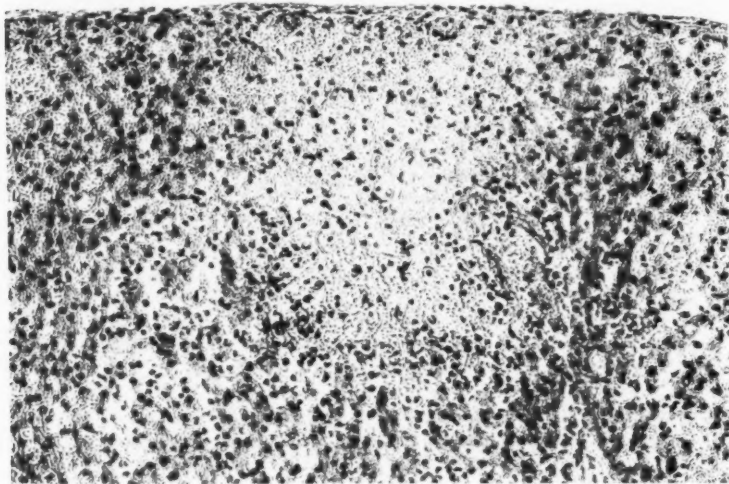


Fig. 3.—Dog 67. Periphery of liver, showing marked subcapsular hemorrhage with beginning necrosis.

placental elements in the blood, we can conceive that a very likely place for coagulation to occur under such conditions would be in the small tributaries in the portal vein in the liver.

From these deductions we attempted to produce experimentally in the dog conditions similar to two of these factors. First, the entering of placental elements in the blood stream. This tissue has a high fibrinogen content and we felt that by the injection of tissue fibrinogen into the general circulation this could perhaps be considered analogous. Second, the injection directly into the portal vein of the same substance after the injection into the general circulation would give a higher concentration of tissue fibrinogen there. We did this in a small series of experiments and were able to show very clearly that marked hemorrhage and necrosis in the periphery of the lobule could be produced as

well as marked portal thrombosis. We then resorted to the injection of tissue fibrinogen in the general circulation and in addition gave it by mouth. In this way we were able to produce lesions similar to those occurring in the first series but not quite so extensive. This work has been reported in two previous publications.

Somewhat encouraged by these results we felt that if the observations of Mills concerning the ingestion of meat protein on the coagulation time was correct we should be able, by continuing the injections in the general circulation and by giving full meals of raw meat by mouth, to produce a coagulation in the tributaries of the portal system in the liver which should produce hemorrhages and necrosis. Our results in this series are the basis of this report.

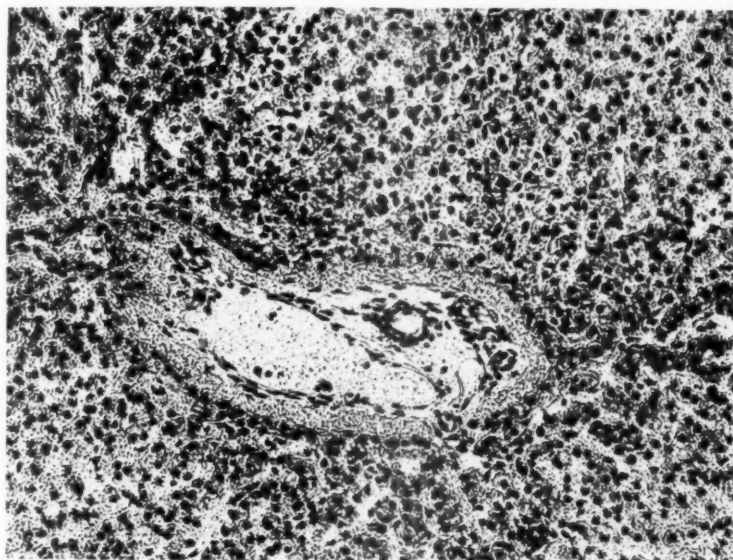


Fig. 4.—Dog 55. A small portal space with marked distention of vein around the periphery; smaller vessels leading to this are likewise distended. Very little hemorrhage observed elsewhere in liver, but in numerous places hemorrhage is seen in the periphery of the lobule, some quite extensive. (See Fig. 5.)

A series of 43 dogs were studied. The dogs received a full meal of raw meat daily followed by the injection of tissue fibrinogen or lung extract in the general circulation one hour later; the dosage varied from $\frac{1}{2}$ to 3 c.c. of tissue fibrinogen or lung extract. Frequently after the injection in the general circulation the animal would cry out, urinate, have evacuations from the bowels, and develop convulsions. The animals were sacrificed at various periods from two to seven days; they were always sacrificed when the symptoms produced by the injections were marked, so as not to have the animal die during the night. In this series of 43 dogs, 22 cases were selected as showing definite lesions. These lesions were described as hemorrhages under the capsule of the

liver and in the periphery of the lobule in that region with necrosis, as midzonal and necrosis, as peripheral hemorrhages and necrosis, and as

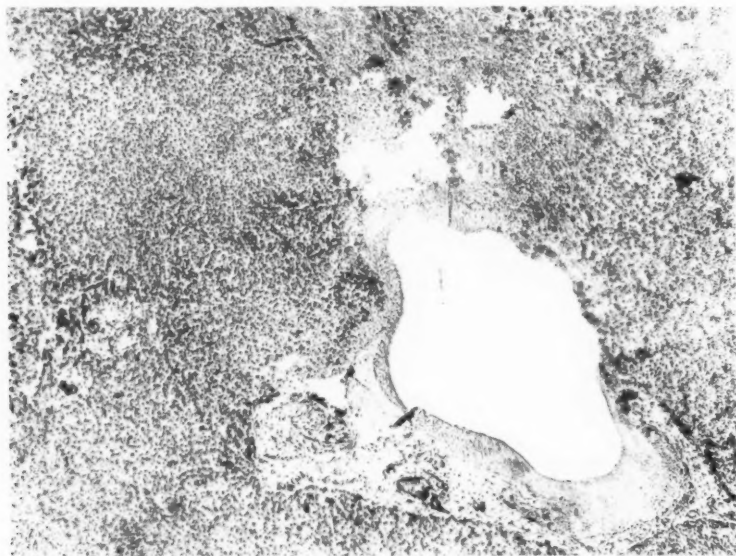


Fig. 5.—Dog 55. Larger portal space. Large dilated portal vein entirely surrounded by an area of hemorrhage. A marked area of hemorrhage and necrosis about 2 cm. in diameter above it. Tissue very friable here and tore easily in handling sections. Bile duct and artery below and to left of vein.



Fig. 6.—Dog 36. Very extensive hemorrhage and marked necrosis similar to Fig. 1 in distribution but necrosis more marked. Lesion produced in nine days.

portal vein thrombosis. Only organizing thrombi in the larger branches of the portal vein in the liver were considered as evidence of thrombosis.

The most marked lesions present were the hemorrhages in the periphery of the lobule underneath the capsule frequently associated with marked necrosis. Almost equally striking were the marked midzonal hemor-

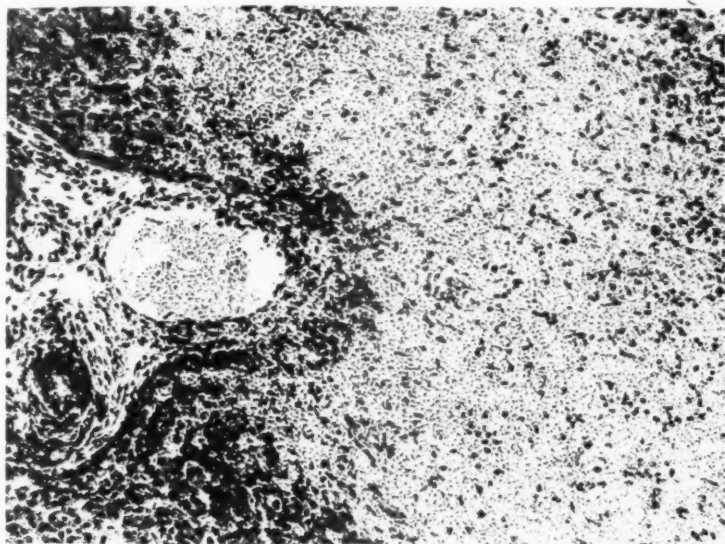


Fig. 7.—Dog. 36. Higher power, showing the marked necrosis and the lesions extending into the portal space.

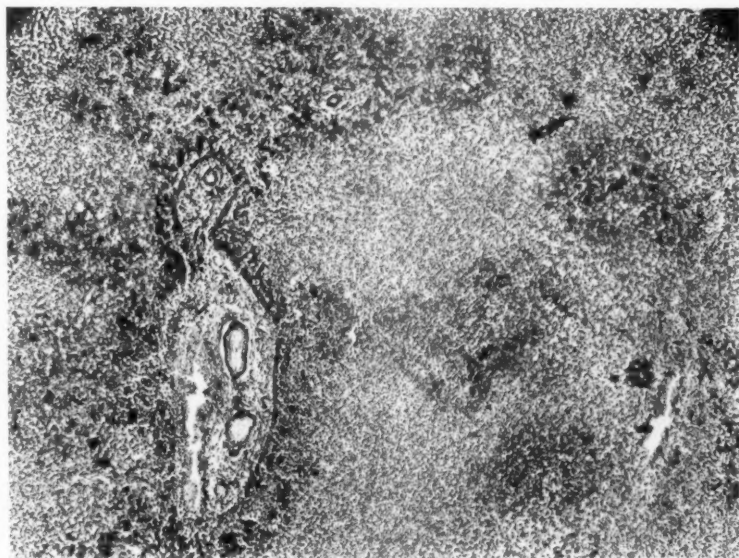


Fig. 8.—Dog 64. Marked hemorrhage and necrosis, chiefly midzonal, but so extensive that practically the entire field is involved. Very small amount of normal liver tissue remains around portal space to left of center.

rhages with marked areas of necrosis and least striking were the peripheral hemorrhages and necrosis about the portal spaces. Marked

TABLE I

SERIES NO.	DOG NO.	GROSS LESION	SUBCAPSULAR		MIDZONAL		PERIPHERAL		PORTAL VEIN THROMBOSIS
			HEM.	NEC.	HEM.	NEC.	HEM.	NEC.	
1	31	Marked Mottling Rt.	2	2	2	1	2	1	--
2	33	Mottling Rt.	3	1	3	1	2	2	--
3	36	Hemorrhage, Extensive Rt.	3	3	3	3	3	3	1
4	39	Mottling	2	--	2	1	--	--	3
5	40	-----	2	2	2	2	2	2	--
6	41	Hemorrhage, Mottling	2	1	2	1	2	--	3
7	42	-----	3	3	2	2	2	1	3
8	43	Hemorrhage Rt.	2	1	2	2	2	1	3
9	55	Mottling	2	1	2	2	2	2	3
10	56	-----	1	--	1	--	1	--	3
11	58	Speckled	3	3	2	1	1	1	3
12	60	Speckled	1	--	1	--	1	--	3
13	61	Hemorrhage Rt.	2	2	2	1	1	1	--
14	62	Hemorrhage Rt.	3	2	3	1	--	--	--
15	63	Hemorrhage, Extensive Rt.	2	2	2	2	1	--	3
16	64	Hemorrhage Rt.	3	3	3	3	3	3	1
17	67	Marked Mottling Rt.	3	3	3	3	3	3	3
18	69	Hemorrhage Rt.	3	2	2	2	--	--	3
19	71	Speckled	2	2	1	1	1	--	3
20	73	Hemorrhage Rt.	3	3	3	1	1	--	--
21	74	-----	3	3	3	3	1	--	--
22	79	Hemorrhage, Extensive	3	1	3	1	--	--	--

NOTE: 1, Moderate lesion. 2, Marked lesion. 3, Very marked. Hem., Hemorrhage. Nec., Necrosis. Rt., Right side of liver.

portal thrombosis was found in quite a number of cases. Table I will show the location and extent of these lesions. In the gross many of



Fig. 9.—Dog 69. Marked midzonal hemorrhage and necrosis.

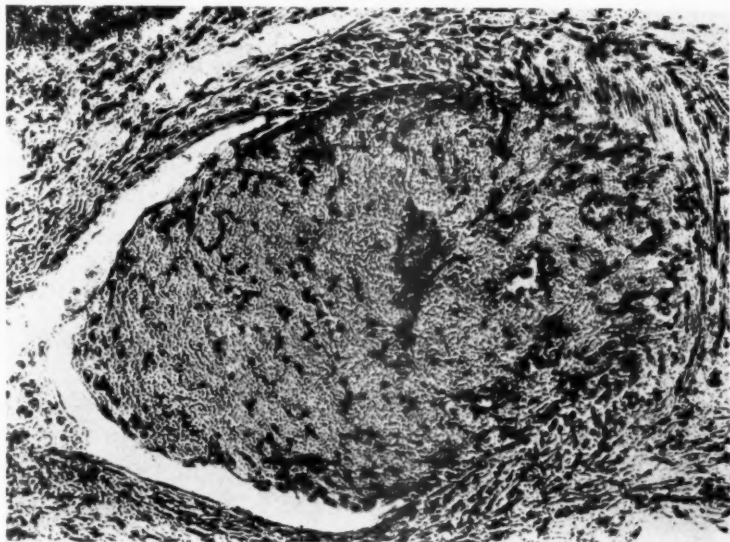


Fig. 10.—Dog 69. Organized thrombus in larger branch of portal vein. Neighboring bile duct and branch of hepatic artery not seen in picture.

the specimens showed hemorrhage in the liver of considerable size with a certain degree of small mottling due to smaller hemorrhages.

The chief difference in this series from our first report was the

production of a marked midzonal hemorrhage with necrosis. These lesions in their appearance were entirely similar to the lesion in eclampsia except that the midzonal area was the origin of the hemorrhage. The hemorrhage extended most markedly from this area to the periphery of the lobule and one might be deceived in regarding the lesion as peripheral. This definitely was not the case. We were at a loss to explain why this should occur but felt that it was possible that coagulation began in the tributaries of the portal vein near the midzonal area and these blood spaces would burst before coagulation could take place in their continuations toward the periphery of the lobule. Under such conditions the blood could escape in the midzonal area first. We felt, however, that the mechanism of the production of this hemorrhage was similar whether it occurred midzonally or peripherally, as the lesion in both locations was essentially a hemorrhage followed by a necrosis in the involved area.

In some cases there was extensive portal thrombosis, recognized by finding marked organized thrombi in larger branches of the portal vein within the liver. Wherever such thrombosis is designated in the chart, organization had taken place in these thrombi. In practically all cases the tributaries of the portal vein were markedly overloaded with blood, many showing marked agglutination of red cells with beginning thrombus formation. We did not include these as evidence of thrombosis unless organization was already present. This was true also in many of the negative cases in which there was a considerable amount of hemorrhage in the periphery of the lobule under the liver capsule. These lesions, however, were regarded as insignificant and therefore disregarded. From our experience with this series, we realize from the reaction in the individual dog and the varying character of the lesions produced that our methods are still comparatively crude and further experience is needed. We are now beginning a series in which smaller doses will be used over a longer period of time accompanied by a pressor substance such as tyramine in order to imitate the action of such substances supposedly present in human eclampsia.

SUMMARY

Although the lesion which has been produced in this series is not typically that of eclampsia, we feel that it is due to the coagulation of red blood cells in the portal vessels of the midzonal area with hemorrhage beginning at this point and a necrosis resulting in the involved tissue. In other words, the same mechanism produces this lesion which is apparently at work in the production of the lesion of eclampsia in the human. As a result of marked hemorrhage and necrosis as well as portal thrombosis produced in some of these cases, we think that substances which were absorbed from the intestinal tract and concentrated in the portal system overloaded this system under the conditions

of the general circulatory injection of tissue fibrinogen and was an added factor in bringing about coagulation in the portal system within the liver.

We feel that the idea of Mills that a marked shortening of coagulation time after the ingestion of a meal rich in meat protein is substantiated by these experiments. One of the striking features of lesions in this series was the rapidity with which extensive damage occurred in some of the cases. This is particularly well shown in Case 67, which is illustrated (Figs. 1, 2 and 3). This dog received 1 c.c. of lung extract one hour after a full meal and died three hours later and was autopsied at once. We feel that this might be evidence of the fact that when an extensive lesion occurs in human eclampsia it may occur rather abruptly and not over a period of a long time such as is characteristic of so-called preeclampsia. The period of so-called preeclampsia may be regarded as a precursor in most cases and a sudden production of a marked liver lesion might precipitate the attack of eclampsia.

In concluding, although the lesions produced in this series are not entirely typical of hepatic lesions in eclampsia, we feel the mechanism of their production is similar to the lesion which occurs in the liver in human eclampsia and, therefore, we feel as we have stated in our first papers that we have further evidence that a hepatic lesion in eclampsia may result from a greater concentration of substances in the portal vein which can bring about thrombosis and which obviously must have their origin in great part from the intestinal tract. We also think this work further emphasizes the value of limiting the meat protein intake and the insistence on good intestinal hygiene in the patients in the last months of pregnancy, thereby averting at least the fulminating types of eclampsia.

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(For discussion, see page 879.)

FURTHER OBSERVATIONS UPON HYDATIDIFORM MOLE, WITH THE REPORT OF A CASE*

BY EDWARD A. SCHUMANN, M.D., F.A.C.S., PHILADELPHIA, PA.

IN 1921 I proposed that certain hydatidiform moles be treated by abdominal hysterotomy, and if the findings warranted, by supravaginal hysterectomy. This procedure was not at all original, it having been advocated by Freund years ago and reiterated by Essen-Möller and Howard C. Taylor. Vineberg has suggested vaginal hysterotomy followed by manual removal of the growth and recently Turenne has reported a case in which abdominal hysterectomy was performed for this condition, the indication being great multiparity (ten pregnancies), evident mole, long and closed cervix, uncontrollable hemorrhage and intense acute anemia.

When presented to the profession, the above plan of treatment met with considerable disfavor, but as time goes on, there is more and more dissatisfaction noted in the literature with the conventional expectant plan of conducting these cases. Bland, for example, says "that expectancy is almost analogous to helplessness. Tardiness has not served to mitigate the primary mortality of the disease nor thwart the development of secondary chorioepithelioma with its widespread metastases. No disease of a potentially malignant nature, one of the chief characteristics of hydatid mole, is amenable to a process of watchful waiting."

It has been definitely established that the primary mortality of hydatid mole lies somewhere between 10 and 15 per cent (Gordon, 9 per cent in a small series, Findley, 10.5 per cent, Williams, 10 to 26 per cent, Hirst, 18 to 25 per cent). This primary mortality is due to hemorrhage, sepsis and toxemia, and does not take into account the secondary death rate from the possible development of chorioepithelioma, in which event the mortality rate rises to 50 or 75 per cent.

As to the frequency of this dread sequel, there is considerable difference of opinion, Findley finding 31.4 per cent, while Williams in a discussion of my paper in 1922, quotes Sunde in the *Acta Gynecologica Scandinavica* as concluding that while 50 per cent of chorioepitheliomas are preceded by moles, only 5 per cent of moles are followed by chorioepithelioma. In Lenarden's series of 49 cases of hydatidiform moles, 13 per cent developed this malignant change subsequently. On the other hand, there is evidence that this tumor is of uncommon occurrence, Symmers stating that not one case was discovered in 12,000 autopsies performed at Bellevue, while in Budapest where pathologists

*Read at a meeting of the Obstetrical Society of Philadelphia, Pa., March 7, 1929.

were searching for such cases for several years, none were found. Yet Lynch states that in eighteen months, seven cases were noted in 2,700 autopsies at the General Hospital of Vienna. At any rate one may estimate the general mortality from mole plus secondary chorioepithelioma as somewhere from 15 to 18 per cent. I submit that this represents one of the very high death rates from the complications of pregnancy and labor, and that if it be possible to do so, some plan of treatment should be devised which will materially decrease the gravity of the prognosis. Furthermore, the secondary morbidity in these cases is high, largely due to the common development of lutein cysts of the ovary in association with hydatidiform mole. In this connection Ewing quotes Patellani's statement that in 68 fully reported cases 62, or 91 per cent presented bilateral cystic changes. This proportion is probably too high, but, nevertheless pronounced cystic ovarian change is so common an accompaniment of hydatid moles as to constitute a definite pathologic feature of the cases.

The treatment of the condition may be divided into two general groups: Firstly, manual removal of the mole followed by curettage, the latter procedure being done even though the entire mass has been expelled spontaneously, the scrapings being examined by a competent pathologist to determine whether or not the tissues present positive or potential malignant change. Secondly, abdominal hysterotomy, preferably under local anesthesia at the time of the positive diagnosis of the presence of mole, the tumor to be completely removed under the eye at this time, and the necessity for hysterectomy determined by an inspection of the uterine musculature and the degree to which it has been invaded or injured by the mole. Immediate examination of frozen sections will materially aid in arriving at a decision. At this time lutein cysts of the ovaries, if present, may be appropriately dealt with.

To discuss these divergent methods in detail: The first has conservatism and simplicity to commend it, and in many instances, if coupled with careful observation of the patient for a year or more afterward and immediate recourse to radical surgery on the recurrence of bleeding, will undoubtedly serve to effect a cure in many cases, as it has in the past. However, it is precisely this plan of treatment which has been followed by the very high mortality as given above and therefore it would seem to be unsatisfactory.

As to the possibility of determining potential malignancy from curetting, pathologists are still divided, though there is a constantly increasing trend of opinion that this is impossible. Thus Hitschmann says positively that there are no morphologic criteria of value in establishing a prognosis. All moles must be regarded as rapidly growing tumors of embryonic origin and of potential malignancy. Caturani and others entirely corroborate this view, and it is a common experience of gynecologists to have a competent pathologist make a diagnosis of

early chorioepithelioma in a mole pregnancy, only to have the patient refuse the radical operation which such diagnosis entails and suffer no ill consequences.

During the manual or instrumental removal of mole via the cervical canal, furious hemorrhage may occur, not rarely to a fatal degree, perforation of the uterus is to be feared and a complete evacuation is problematical. These dangers are greatly enhanced, should the cervix be long and rigid as in a primipara and in those cases where the patient is a poor risk by reason of previous blood loss or infection.

The second plan of treatment, to which I am committed, may be outlined as follows: A preliminary blood transfusion is given in cases where there is marked anemia, the result of hemorrhage. Abdominal hysterotomy is performed, preferably under local anesthesia (morphine sulphate gr. $\frac{1}{4}$, scopolamine hydrobromide gr. $\frac{1}{100}$, hypodermically, one hour before operation, and then local infiltration with $\frac{1}{2}$ per cent novocaine solution), or, if local anesthesia is not well borne, by a light inhalation anesthesia. The uterus may be opened on its anterior aspect with but little blood loss, the mole removed, and the uterine wall carefully inspected for areas of marked thinning, intramural hemorrhage, or widespread and deep invasion of the uterine muscle by the proliferative process. If the uterine muscle is in relatively good condition, the cavity may be swabbed with iodine, firmly packed with gauze, the end of the pack being thrust through the cervical opening, and the wound in the uterus carefully closed by layer suture, after which the abdominal incision is closed.

Where the uterus has undergone massive invasion with syncytial elements or where many hemorrhagic areas are present, supravaginal hysterectomy is the procedure of choice. At the same time the lutein ovarian cysts which so commonly accompany hydatidiform mole may be appropriately dealt with, by the removal or resection of one or both ovaries.

This method of treatment is especially indicated when the bleeding is profuse, the cervix rigid, and the patient near the climacteric. Abdominal hysterotomy has been criticized as a proper method of attack, by reason of the gravity of the operation and the probability that many uteri will be needlessly sacrificed as a result of such procedure. These criticisms are not well taken, because abdominal hysterotomy offers a far better opportunity to secure complete evacuation of the uterine contents under the eye than does mere manual exploration, and at the same time hemorrhage is under much better control. The dangers of perforation are eliminated, and the operator obtains an exact knowledge as to the condition of the uterus and the possible necessity for the performance of hysterectomy. The primary mortality of abdominal exploration is rather less than when the vaginal route is selected, and the morbidity is certainly no greater.

In those fortunate cases where the mole is loosely attached and is expelled spontaneously, en masse, without alarming hemorrhage, the uterine cavity may be explored with the finger and if its surface is found smooth, it may be hoped that no deep invasion has taken place and that no further treatment is necessary, save continued observation.

Radium therapy alone, or with deep x-ray is still sub judice, but inasmuch as both moles and chorioepitheliomas are made up largely of embryonal tissue, they should succumb readily to radiation and this adjuvant to more radical treatment should never be neglected.

The following case discovers many interesting points in the clinical manifestations and the problems involving these bizarre teratomas:

R. G., eighteen, married, was admitted to Chestnut Hill Hospital October 26, 1928, complaining of vaginal bleeding. The patient was a healthy young girl who was married at the age of sixteen and was delivered of a normal baby, by forceps, seven months before this admission.

Four months after her child was born she had a painless bleeding from the vagina which lasted a few days. About two weeks later she again had some vaginal bleeding unaccompanied by pain. There has been spotting and irregular bleeding until the day before admission when she had a profuse hemorrhage for which her physician advised hospitalization.

The family and past medical histories were irrelevant, the patient having always been healthy. Menses at fourteen years, twenty-eight-day type, flow lasting three to four days.

Physical examination: a thin Italian girl, nervous and apprehensive. The head, neck, heart and lungs presented no abnormalities. The abdomen showed the striae of a former pregnancy, and a smooth, rounded, fluctuating tumor extending from the symphysis to the umbilicus. This tumor strongly suggested a six months' pregnancy, although fetal parts could not be distinguished, nor were the fetal heart sounds audible. The patient insisted that she felt fetal life which in great measure influenced the diagnosis. X-ray examination of the abdomen was negative for a fetal skeleton.

On vaginal examination, the vagina was found cyanosed, the cervix soft, admitting one finger, with no effacement. A little blood escaped from the cervix after examination. The uterus was enlarged to the size of a six months' pregnancy, but no presenting part was palpated. The diagnosis lay between hydatidiform mole and placenta previa with hydramnion and, because of the insistence of the patient that she was aware of fetal movements, the latter condition was considered as the true one.

On the day after admission, the patient had a very free hemorrhage, which necessitated packing. On the following day there was more bleeding and the cervix being partially dilated, the examining finger detected an irregular mass in the lower uterine segment, which was recognized as a mole and under gas anesthesia, the entire mass was manually removed, the uterus firmly packed and 500 c.c. of blood administered by transfusion. All bleeding ceased and the patient made a good recovery, leaving the hospital in eight days. On examination for discharge, the uterus was in process of involution, both tubes were normal, the ovaries slightly increased in size.

On Oct. 21, 1928, less than one month after the expulsion of the mole, the patient was readmitted, complaining of nausea and severe pain in the right lower quadrant of the abdomen, with the presence of a distinct mass. The woman seemed in good general condition, no cardiac or pulmonary lesion being demonstrated.

There was slight rigidity over the right rectus and a large smooth mass, 8 to 12 cm. in diameter, was easily palpable in the right lower quadrant. The mass was tender to deep palpation and was quite freely movable. On vaginal examination, the cervix was found patulous, the uterus about twice normal size, and both ovaries had been converted into cystic masses easily 8 to 12 cm. in diameter. The cystic right ovary constituted the tumor felt on abdominal palpation.

The uterus was normal, the hemoglobin 65 per cent and the leucocytes 7500. A diagnosis of lutein cysts of the ovaries was made and laparotomy performed under nitrous oxide-oxygen anesthesia. The uterus was found to be of about twice the normal size, as one would expect after less than one month's involution. The tubes were normal, but both ovaries had been transformed into multilocular lutein cysts, the right 14 cm. in diameter and the left 12. Salpingo-oophorohysterectomy was performed, the convalescence was uneventful and the patient left the hospital on the fourteenth day after operation.

The pathologist reported bilateral lutein cysts of the ovary and an area of chorioepithelioma, occupying the right side of the uterine fundus.

This case presents the following points of interest: A diagnosis of hydatidiform mole confused by the insistence of an intelligent multipara that she felt fetal movements. The very rapid development of large lutein cysts of both ovaries after expulsion of a mole. The presence of chorioepithelioma in the fundus uteri one month after the termination of a mole pregnancy.

1814 SPRUCE STREET.

(For discussion, see page 885.)

Beckers: Chronic Nephritis and Pregnancy. *Bruxelles-med.* 7: 1237, 1926.

Pregnancy, undoubtedly, has a deleterious influence on chronic nephritis. This may be due to digestive troubles, in which an increased absorption of toxic products occurs in the intestines. They must be eliminated by the kidneys. In some cases the colon bacillus may pass by way of the blood stream to the kidneys thus causing a pyelitis or pyelonephritis. Again, during pregnancy, there is an increase of the nitrogenous products to be excreted, which is in direct opposition to the best treatment of chronic nephritis. Further, the uterine enlargement may cause circulatory disturbances. Finally, compression of one or both ureters will lead to retention of nitrogenous products.

Occasionally pregnancy may give rise to renal lesions called the nephritis of pregnancy. That fetal life is in some way bound up etiologically with these conditions is shown by the fact that the albuminuria often disappears upon intra-uterine death and before expulsion of the fœtus.

Approaching trouble is manifested by retention of chlorides with edema. Here the treatment should be a salt-free diet. A straight milk diet is objectionable because of its high salt and fluid contents, also might cause a nitrogenous retention. In severe cases, only water should be allowed and free purgation instigated. In the milder cases the diet should be restricted to fruits and green vegetables. At times therapeutic abortion may become necessary. Where arterial hypertension is the outstanding feature, a strictly vegetable diet should be adhered to, combined at times with blood letting.

THEODORE W. ADAMS.

ANALYSIS OF EIGHTY-FOUR CONSECUTIVE CESAREAN SECTIONS*

BY JOHN COOKE HIRST, A.B., M.D., F.A.C.S., PHILADELPHIA, PA.

(*From the Department of Obstetrics, Hospital of the University of Pennsylvania*)

FROM January, 1926, to September, 1928, 1279 women were delivered in the maternity wards of the Hospital of the University of Pennsylvania, 84, or 6.5 per cent of whom were delivered by cesarean section. During this period of time 2700 women were delivered on the outside or South-Eastern Dispensary service of the Department of Obstetrics, of whom 89 were admitted to the maternity, and 14, or 0.51 per cent were sectioned. Eighty-four cesarean sections from a total of 3979 deliveries shows that 2.1 per cent of all cases under the care of this department required delivery by section, which represents a conservative attitude on this subject.

The sources and incidence of these deliveries and sections admitted to the hospital were as follows:

TABLE I

		TOTAL	CESAREAN SECTIONS	PER CENT
Prenatal Clinic	(55%)	704	33	4.7
Staff	(25%)	320	25	7.8
Outside Physicians	(10%)	128	12	9.3
South-Eastern Dispensary	(7%)	89	14	15.8
Receiving Ward	(3%)	38	0	0
		1279	84	

This table shows that we considered it necessary to operate upon one out of every 21 women who came to us for careful prenatal observation.

The reasons for performing the cesarean section are shown in Table II.

These operations were done by the regular staff of the University Maternity comprising 6 individuals, 3 of whom accounted for the large majority of the sections. There is therefore listed a number of procedures which are briefly explained under Table III.

At this point, certain items of procedure must be mentioned in order to qualify the accompanying records. The following methods have been fairly uniformly employed by our clinic:

1. Preoperative preparation does not include morphine.
2. Anesthesia in most instances is gas-oxygen, with a minimum of ether. Only two cases were performed under local anesthesia.

*Read at a meeting of the Obstetrical Society of Philadelphia, Pa., March 7, 1929.

TABLE II. INDICATIONS FOR CESAREAN SECTION

1. Contracted Pelvis	45
a. Elective sections:	
1. Deformed pelvis	6
2. Deformed pelvis with previous section	19
b. Emergency sections:	
1. Dystocia in deformed pelvis	17
2. Dystocia in deformed pelvis with previous section	2
3. Deformed pelvis with placenta previa	1
2. Indications Other Than Contracted Pelvis	39
a. Elective sections:	
1. Previous section with disproportion	5
2. Previous dystocia with fetal mortality	3
3. Disproportion	1
4. Obstructing pelvic tumor	3
Ovarian cyst, 1; Myoma Uteri, 2.	
5. Habitual death of fetus	1
6. Sacculation of uterus from fixation by previous operation	2
7. Cardiac disease	1
8. Pulmonary tuberculosis	1
b. Emergency sections:	
1. Dystocia	16
Disproportion	6
Disproportion and previous section	1
Sacculation of uterus from fixation by previous operation	4
Cervical dystocia in elderly primiparae	3
Placenta previa complicating labor	1
Inertia uteri due to pulmonary tuberculosis	1
2. Placenta previa	2
3. Abruptio placentae	1
4. Eclampsia	1
5. Intestinal obstruction	1

TABLE III. TYPES OF CESAREAN OPERATIONS PERFORMED

	ELECTIVE	EMERGENCY	TOTAL
High classical	17	17	34
Low classical	12	8	20
Kerr cervical	8	6	14
Beck cervical	3	9	12
Marsupialization	0	2	2
Porro	2	0	2
Total	42	42	84

3. No preliminary cervical dilatation in the elective operations.

4. No intrauterine packing in any case.

5. Preliminary mercurochrome gauze vaginal packing introduced while the patient is on the table and removed as soon as operation is ended, is used in neglected or examined cases.

6. All fundal uterine incisions are sutured by Piper's (or modified) special subserous water-tight gut suture, giving freedom from distension and adhesions somewhat similar to the cervical operation.

7. Abdominal wound suturing comprises the usual procedure, using derma skin and 3 or 4 silkworm-gut tension sutures.

8. Aseptic ergot and pituitrin are administered as the operation is well begun.

"High Classical Cesarean Section" refers to the usual operation, with an abdominal incision $\frac{1}{3}$ above and $\frac{2}{3}$ below the umbilicus, and the common miduterine incision; sutured in a special manner described later.

"Low Classical Cesarean Section" means a low "gynecologic" abdominal incision, with a vertical uterine incision as low as possible (to the bladder), closed by special suture.

"Kerr Cervical Cesarean Section" is the now well-known procedure illustrated in this article. (See Figs. 1, 2, 3, 4, 5, 6.)



Fig. 1.—This and the following figures show the author's modifications in the preliminary and final stages of the Kerr operation. Wound protection

"Beck Cervical Cesarean Section" is the original Beck technic, with one transverse serous uterine incision and one longitudinal muscular incision.

"Marsupialization Cesarean Section" refers to the extraperitoneal technic of B. C. Hirst, whereby uterine peritoneal flaps mobilized by low vertical incision are attached to the corresponding cut parietal peritoneal edges before the uterine musculature is incised.

TABLE IV. NUMBER OF PRIOR CESAREAN SECTIONS

1. Total number of sections		84
2. Total in which previous sections were performed		29
One previous section	20	
Two previous sections	7	
Three previous sections	2	

Our results are given exactly as noted, without any exclusions. All cases admitted with temperature are included under operative morbidity. The chief disappointment that we experienced was in three cases of peritonitis, unfortunately twice in elective cases, one of whom was a most difficult repeat operation and bad surgical risk.

We feel justified in explaining some of the mortality under the dys-

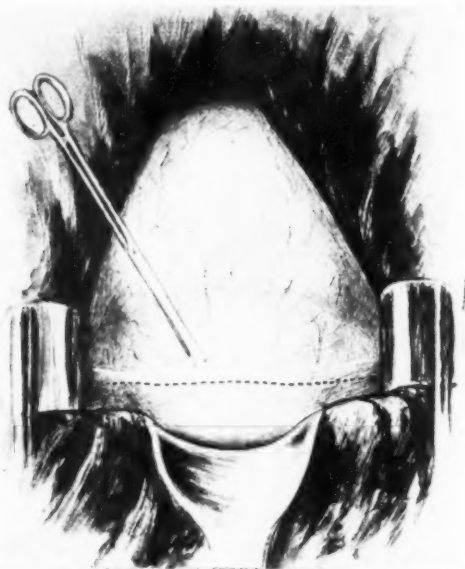


Fig. 2.—Incision in peritoneal fold over head and above bladder.

TABLE V. MATERNAL AND FETAL MORTALITY

1. Total number	84
2. Maternal mortality (all cases)	7 (8.33 per cent)
Hemorrhage (ablatio)	1
Peritonitis	3
Shock	1
Eclampsia	2
3. Mortality in elective group:	
Total elective operations	42
Total mortality	2 (4.76 per cent)
Peritonitis	2 (1 Kerr Section with fixation and sacculation of the uterus with diabetes.)
4. Mortality in emergency group:	
Total emergency operations	42
Total mortality	5 (11.9 per cent)
5. Fetal mortality (total)	17 (20 per cent)
Prematurity	3
Intracranial hemorrhage	7 (long labors)
Maceration (abruptio, eclampsia)	2
Placenta previa	3
Adenoma, thyroid	1
Narcosis	1 (morphine)

tocia group by noting a large percentage of dry and prolonged labors occurring before hospital admission, shown in Table VI.

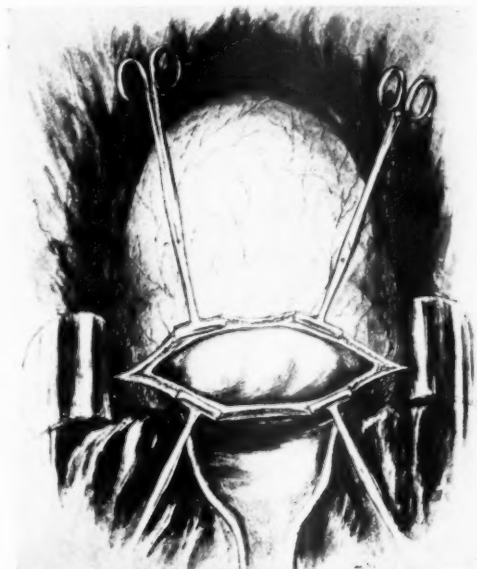


Fig. 3.—“T” clamps on thin uterine muscle to control hemorrhage if present. Shows membranes herniated.

TABLE VI. CESAREAN SECTION IN DYSTOCIA GROUP

1. Total number			35
Contracted pelvis	19	Inertia uteri	1
Disproportion	7	Sacculation	4
Cervical dystocia	3	Placenta previa	1
2. Average number of hours of labor before section			29.1 hours
3. Average number of hours membranes ruptured (15 cases)			25.2 hours
4. Average number of vaginal examinations (29 cases)			2.2
5. Number of patients febrile preoperative			16
Classical	8		
Cervical	8		
Extraperitoneal	0		
6. Types of Cesarean Section Employed:			
Low classical	6		
High classical	12		
Kerr cervical	6	Fundal = 18	
Beck cervical	9	Cervical = 15	
Marsupialization	2		
	35		
7. Maternal mortality (dystocia group)			2
Shock	1 (Beck operation)		
Peritonitis	1 (High classical operation)		
8. Febrile morbidity (eliminating 3 day postoperative fever)			25 (71 per cent)
(See explanation, Table VII, item 2.)			
Eliminating causes other than puerperal fever, as			
pyelitis, mastitis, pneumonia, tuberculosis, (12)			
Fundal operation morbidity, out of 15 = 40 per cent			
Cervical operation morbidity, out of 18 = 39 per cent			



FIG. 4.—Uterine muscle closure, with 3 or 4 stay sutures and tier continuous suture.

TABLE VII. TOTAL FEBRILE POSTOPERATIVE MORBIDITY

1. Total number	85	
2. Total febrile morbidity postoperative (Excluding postoperative reaction)	48 (57 per cent)	
a. Excluding causes other than puerperal fever:		
Pyelitis	9	
Pneumonia	3	
Pulmonary tuberculosis	1	
Mastitis	4	
Hypodermic abscess	1	
Pleurisy	1	
Eclampsia	1	
	(20)	28 (33 per cent)
b. Causes of puerperal fever (Febrile postoperative morbidity)		
Endometritis	19	
Lochial block	6	
Peritonitis	3	
3. Puerperal fever analysis:		
a. Dystocia group, of 35 there were febrile		15 (43 per cent)
Fundal operation (of 18)	7 (39 per cent)	
Cervical operation (of 15)	6 (40 per cent)	
Extraperitoneal operation (of 2)	2 (100 per cent)	
(Marsupialization)		
b. Elective group of 42 there were febrile		11 (26.2 per cent)
Fundal operation (of 29)	6 (20 per cent)	
Cervical operation (of 11)	5 (45 per cent)	
Porro operation (of 2)	0 (0 per cent)	
c. Emergency group, of 42 there were febrile		17 (40 per cent)
Fundal operation (of 25)	9 (36 per cent)	
Cervical operation (of 15)	6 (40 per cent)	
Extraperitoneal operation (of 2)	2 (100 per cent)	

It should be borne in mind that the University Maternity morbidity standard is much more strict than most, because any woman showing



Fig. 5.—Tacking down upper serous flaps.

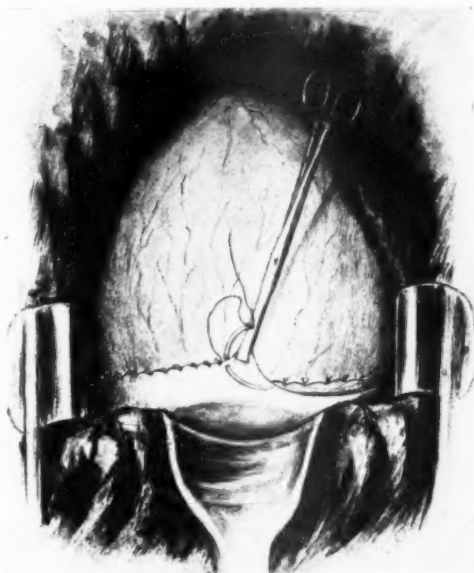


Fig. 6.—Continuous overlapping of lower serous flap with the fine inverting suture.

a temperature of 100° F. twice in any twenty-four-hour period, taken every four hours, *no causes excluded*, is considered morbid from child-birth.

Wound complications are determined by the American College of Surgeons Classification, briefly as follows: Types "A" and "B" may not be true infections, and are mainly serum collections, superficial pus pockets, hematomas and the like. Type "C" signifies any wound discharge giving a positive culture; any fascia defect; or any wound condition causing overtime hospitalization. Such complications were:

TABLE VIII. WOUND COMPLICATIONS

1. Total number of sections, elective—42, emergency—42				84
2. Total wound complications				9 (10.7 per cent)
a. Elective group	3	A—2	B—0	C—1
Emergency group	6	A—1	B—4	C—1
b. No labor prior to operation	3	A—2	B—0	C—1
Section during labor	6	A—1	B—4	C—1
c. Fundal operations	5	A—3	B—1	C—1
Cervical operations	4	A—0	B—3	C—1

We should like to supplement the foregoing records with a brief statement of a personal series of 85 additional consecutive cesarean sections from 1920 to 1928, with two deaths, one from peritonitis, and the second at two weeks from metritis after myomectomy. In this series were:

One ruptured uterus, 18 hours duration (recovered).

Three cases operated on after induction of labor by bougies and bag (recovered).

Other complications such as ovarian cyst, chronic appendicitis, tuberculosis, cardiac disease, etc.

Two cases of macerated fetus, wherein the cervix did not permit vaginal section (recovered).

COMMENT

In choosing between the low classical cesarean with overlapping (Piper) serous suture, the Beck cervical, and the Kerr cervical, arguments appear to favor the Kerr operation in many types of cases, for the following reasons:

1. There is usually little hemorrhage.
2. It is easy and rapid.
3. Immediate and remote recovery is quite as satisfactory as in the Beck cervical technic.
4. Uterine suturing is very simple.

The illustrations of the Kerr cesarean section show the technic that has given us the best results. The only question that may be raised at the present time in regard to this operation is whether the scar will withstand subsequent pregnancy and possibly labor as well as that of other types of procedure. This question cannot be answered until sufficient time has elapsed for three or more operations of the Kerr type to be performed on the same individual, although it is reasonable to assume that ultimate results will also be satisfactory.

1918 PINE STREET.

(For discussion, see page 884.)

REPORT OF A CASE OF OVARIAN PREGNANCY

BY ABRAHAM STRAUSS, M.D., CLEVELAND, OHIO

(From the Surgical Service of Mt. Sinai Hospital)

I BELIEVE that this case fulfills the criteria on which to base a diagnosis of ovarian pregnancy as laid down by Spiegelberg in 1887 and also has the embryo in the sac.

Patient, A. R., white, aged thirty-three, married six years, admitted to Mt. Sinai Hospital, August 10, 1928, complaining of vaginal bleeding and abdominal pain of two weeks duration. She always had had good health. Has two children living and well. Both labors were normal. She had no miscarriages. Menses were always regular, every twenty-eight days, flow five days, moderate in amount, not painful. Last menstrual period May 17, 1928. Previous menstruation April 18. No period in June or July until present illness.

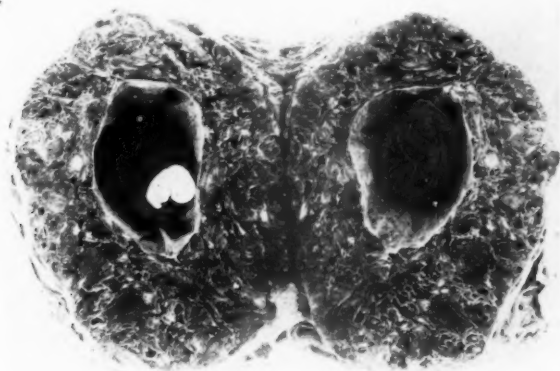


Fig. 1.—Ovary bisected. Gestation sac containing blood clot and embryo attached to placenta by umbilical cord.

On July 24, 1928, the patient had severe, sharp, needlelike pains throughout her entire abdomen, radiating to the back. She fainted at the onset of these pains. At the same time she noticed vaginal bleeding. It was profuse at first but gradually subsided and the next week she only spotted. On one occasion she passed a large clot. Two days before admission the abdominal pains were again severe, radiating to her shoulders. Morphine was given to control the pain. Vaginal bleeding increased in amount in the few days before admission. At the same time she experienced severe burning pain with micturition.

Abdominal and vaginal examinations on admission yielded the only positive findings. A definite prominence was noted in the hypogastrium. The whole lower abdomen was tender and slightly spastic. The cervix was soft, admitted one finger. The uterus was enlarged and tender. Over the top of the fundus and extending into the left fornix and indefinitely into the culdesac there was a tender mass about three inches in diameter. It was difficult to make out this mass separate from the uterus. There was a bloody discharge from the uterus. Blood count: R. B. C. 4,900,000; Hgb. 70 per cent; W. B. C. 5,600.

Blood pressure 120/70. Pulse 90. Temperature 98.6. Wassermann and Kline precipitation tests negative. Diagnosis of ectopic pregnancy was made.

Operation.—Nitrous oxide and ether anesthesia. Midline hypogastric incision. Uterus was the size of a two months' pregnancy but quite firm. No nodular growths present. Right tube and ovary were normal. The left ovary was replaced by a large purplish, red tumor mass about three inches in diameter which was quite firmly bound down on the posterior surface of the broad ligament and the sigmoid by numerous adhesions. Left fallopian tube was apparently normal except it had become more or less flattened out due to the pressure from the ovarian tumor. The ovarian tumor was freed by finger dissection. The ovarian pedicle was clamped, severed, and the left ovarian tumor removed with the tube. Section of this tumor mass showed the presence of a primary ovarian pregnancy. The ovarian pedicle was ligated with No. 2 chromic catgut. The cecum was delivered and a long appendix, about four inches in length, was severed from its mesentery and removed by cautery, purse string method. Vessels of mesentery ligated.

Examination of specimen.—Ovary measured approximately 9 by 6.5 by 7 cm. The external surface bluish red, covered here and there by tags of fibrous tissue. Section shows a gestation sac, approximately 4 cm. in diameter, in which there is an



Fig. 2.—Ovary. A. Corpus fibrosum. B. Chorionic villi ovary.

embryo measuring 11 mm. crown-rump length (approximately forty-two days pregnancy). There is an umbilical cord attaching the embryo to the placenta. The placental tissue has almost entirely replaced the normal ovarian tissue and measures approximately 18 to 25 mm. in thickness. There is fluid and blood clot in the gestation sac.

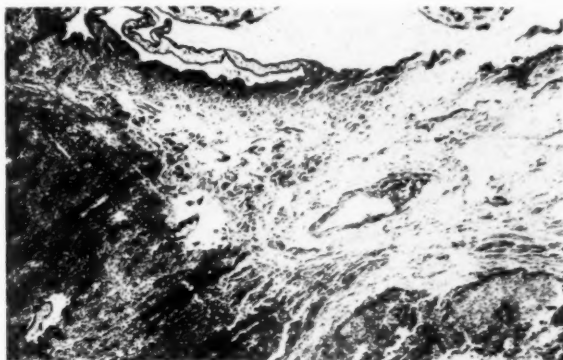
Appendix: Distal 8.5 cm. diameter approximately 7 mm. Serosa is covered in distal half by reddish-brown, friable material, apparently blood clot. There is considerable injection of distal half of appendix. On repeated section lumen continues to within a few mm. of tip, moderately dilated, contains brown fecal material. There is slight edema of all coats.

Section of the appendix shows a diameter approximately 8 mm. Lumen moderately dilated, contains fecal material. There is some increase in eosinophiles, otherwise inner coats not appreciably altered. Serosa is edematous, covered by a layer of fibrin in which there is a moderate number of wandering cells. There are also a number of islands of typical decidual cells attached to serosa. Nuclei of decidual cells well stained, cell outlines well defined.

Two additional sections show a similar picture except that there is no decidual reaction in serosa.

One section of ovary shows no recognizable ovarian tissue. There are a number of chorionic villi widely separated by red blood cells. Villi show early degenerative

changes, a number blue stained. Syncytium two layers in thickness. There are scattered decidual cells present, nuclei of which are well stained. Cell boundaries poorly defined. Another section shows in addition typical ovarian tissue surrounding chorionic villi. All of the villi in the section show degenerative changes of moderate to considerable degree. A number are present in and about dilated thin-walled blood vessels, in the walls of which there are large spindle cells apparently involuting decidual cells. Some of the vessels appear ruptured and there is blood clot in the neighborhood.



X.

Fig. 3.—Fallopian tube with chorionic villi outside at X. No reaction within the tube.

Fallopian tube: Two sections. Distal portion shows moderate scarring and leucocytic infiltration of all coats, the lumen, somewhat dilated, contains blood clot. In the outer coats, in places, there are groups of chorionic villi, majority showing considerable degeneration. In places, there is regional hemorrhage. In places, there are large spindle cells, apparently involuting decidual cells. In places, chorionic villi are present within dilated thin-walled blood vessels.

Final Diagnosis.—Ovarian pregnancy of approximately forty-two days' duration with small amount placental tissue.

The patient made an uneventful recovery and was discharged from the hospital on the fourteenth day after operation.

518 MEDICAL ARTS BUILDING.

THE CARE OF THE LACTATING BREAST

BY FRED B. SMITH, B.S., M.D., HOUSTON, TEXAS

THE subject considered in this paper is the most generally neglected phase of the obstetrician's obligation to the parturient patient. After having guided her safely through the dangers of her antepartum period, exercised his skill and judgment at the time of delivery, and given a few words of advice in regard to her postpartum activities, he usually considers his responsibility ended. Yet, at this time the mother's breasts are undergoing changes which may result in more physical pain, a greater constitutional reaction, and a longer convalescent period than is caused by parturition itself. Often the infant is deprived of his most favorable food supply. The physician is embarrassed by being forced to treat a condition which is due to his, or his agent's, negligence; therefore, he must maintain a policy of watchful expectancy until the mother is safely past the danger of breast complications.

The care of the breast during pregnancy needs very little consideration, for we may say that a normal breast needs no treatment. Nature herself is preparing the gland for its future task; and, unless some definite indication for interference arises, the process should be left strictly alone. Proprietary lotions and oils sold to the mother are worse than useless. No beneficial results come from wearing tight brassieres or from massaging. Indeed, the latter is often harmful, as it results in a hyperplasia of the fibrous supporting structures of the breast at the expense of the secreting portions. Nipples, which early in pregnancy seem depressed, usually become protuberant during the later months. The nipple which is frankly inverted yields to manipulation so rarely, and the manipulation is accompanied by such danger of injury and infection that the attempt is not justifiable. The mother with such nipples should be advised to forego placing her baby to the breast from birth, as it is seldom that an infant can obtain the milk satisfactorily from an inverted nipple, and practically an impossibility to prevent breast complications if it persists in the effort. Fissures and abrasions of the nipple occurring during pregnancy require the same treatment as those occurring postpartum.

Ordinarily the passive breast of pregnancy remains in its state of simple generalized hyperplasia for several days following parturition. Then, in a few hours, it becomes one of the most active organs of the body. Its venous and lymphatic stasis, its tumefaction and hyperemia, the acute dilatation of its tubules and acini, and the hypertrophy of its lobules, all invite bacterial invasion. It is at this time that the obstetrician must be most observant and prophylaxis most scrupulously practiced.

Prophylaxis against bacterial invasion begins with the first attempt of the infant to nurse. This occurs, usually, from six to twelve hours after birth. As we cannot free the infant's mouth of bacteria, we direct our efforts toward the mother's nipple, seeking to prevent the entrance of bacteria into the breast. Numerous agents have been suggested for this purpose. Of these, a saturated solution of boric acid is the most universally accepted, being applied to the nipple before nursing, or both before and after. Yet, such a solution has no advantage over plain water, as Van Dolsen, of Philadelphia, has shown that the various strains of staphylococcus, the most frequent invader of the breast, grow readily on cultures of boric acid solution. As it gives rise to a false sense of security, boric solution should be abandoned. In 1926, Van Dolsen advanced the idea of using a modified Dakin's solution; that is, a one-tenth of 1 per cent solution of sodium hypochlorite in sterile water. I have observed the use of this for over a year and regard it with great favor. In 250 patients on whom it was used, there developed one case of breast abscess (0.4 per cent). The same obstetricians delivered 850 patients on whom boric solution was used, and breast abscess developed nine times (1.06 per cent). The modified Dakin's solution is easy to apply. The solution, on a small sponge or pledget of cotton, is placed in contact with the nipple for one minute immediately preceding the act of nursing. After taking the infant away, the nipple is sponged with sterile water to remove the film of milk left by the infant's lips. When this technic was begun, the principal objection offered was that the chlorine content of the solution would cause an acute dermatitis of the nipple and areola. So far, this complication has never been encountered, nor has there been noted any injurious effect on the baby. The solution should be freshly prepared, tightly corked, and kept in a dark place to prevent its becoming inert.

During the time that lactation is being established, the most frequent complications arising are nipple fissures, excessive sagging of the breast, engorgement, and "caking," the latter being only a pronounced degree of engorgement. Of these, fissured nipples demand the greatest consideration, for they are the portals through which bacteria enter the lymph channels and gain access to the deeper structures of the breast. They are minute breaks in the epithelial covering of the nipple, which may or may not bleed, and which are practically always the result of unavoidable trauma to the nipple by the lips and gums of the infant. Their detection is the signal for vigorous treatment. First, we strive to keep them aseptic by allowing the baby to nurse through a sterile glass nipple shield, or by emptying the breast with a pump. Tincture of benzoin compound is applied to the nipple and areola after each nursing. The fissures may be touched with 10 per cent silver nitrate solution but care must be taken that the solution is applied only to the fissures, and this is easily done by using a toothpick as an

applicator, moistened with the silver nitrate. Exposure of the nipple to ultraviolet light, or sunlight, hastens the healing process. Usually the fissures yield to this plan of treatment within thirty-six to forty-eight hours. If they do not, it becomes necessary to place the nipple in a state of absolute rest. This is secured by applying a snugly fitting breast binder, stopping the nursing or pumping, and avoiding all manipulation of the breast. Pain and engorgement may be controlled by codein and the intermittent application of ice bags. Meanwhile, the baby may be given one of the artificial foods. This treatment may be safely kept up for forty-eight to sixty hours. If the fissures are still present at the end of that time, the baby must be permanently placed on a formula, as it would be folly to permit nursing while they are still present, and further treatment results in a 'drying up' of the breast. However, it is rarely necessary that nursing be abandoned.

Excessive sagging, engorgement, and "caking" may be considered together, as they are all interrelated. Stasis of the venous and lymphatic flow, following the bending of the lactiferous tubules, is their common etiologic factor. These conditions are extremely painful, but of more importance is the fact that a breast in the state of engorgement is also in the state of least resistance to bacterial invasion. It is during this period that bacteria most frequently pass through the nipple and begin their journey inward. The treatment of these conditions begins, and is usually successfully ended, by securing mechanically corrected posture. When the gland is restored to its normal anatomic position, the engorgement rapidly subsides. The breasts are lifted upward and inward and pushed closely together in the midline. This should be done without compression of the breasts, using a binder twelve inches wide. The binder's tendency to wrinkle is lessened by making it of six to eight thicknesses. It should fit snugly, but not tightly, and the upper one-third need not be pinned. The entire surface to be covered should be powdered, and soft lint or cotton should be placed at the sides and between the breasts to prevent chafing. A saline cathartic is given; the baby is temporarily removed from the breast, and morphine may be given. If the engorgement is not relieved, ice bags may be applied. They are applied for two hours, then taken off for two hours; and this schedule is maintained for twelve hours after the temperature has dropped to normal. In the absence of infection, or if the infection is going to respond to this treatment, the breasts will become softer and free from pain in a few hours.

A word of caution should be given here against manipulating an engorged breast. There is a widespread belief, especially among the laity and practical nurses, that the condition is caused by an accumulation of milk, and that relief follows removal of that milk. The milk is sometimes removed by pumping, oftener by massage. In skilled hands and under the best conditions this affords only temporary relief, for

the underlying cause is not corrected. And to subject a breast that is already in a pathologic condition to the assault of a determined woman, intent on expressing milk, assures the patient of further complications. Tissues already taxed to the point of lowered vitality are traumatized, bacteria are drawn deeper into the gland, and trouble ensues—usually abscess. Except for the treatment mentioned above, an engorged breast should be undisturbed.

In the presence of infection the traumatized, engorged breast develops one of the four types of acute mastitis: namely, subareolar, parenchymatous, interstitial, or submammary. Of these, the parenchymatous type is by far the most common. Since the treatment of all four is essentially the same, the differential diagnosis may be passed over. The breast has been properly supported, ice has been applied, the saline purge administered, and the breast has not received insult by massage or pumping or nursing. Yet, after forty-eight hours, there is no improvement in the patient's condition, or her symptoms are aggravated. The fever becomes alarming. Chills appear. All the cardinal symptoms of suppuration are noted. Then we know that somewhere in the gland an abscess is forming. As soon as this is evident, the ice bags are removed and hot, wet applications are substituted, care being taken not to burn the skin. These applications are continued for twenty-four hours. At the end of that time the abscess is usually palpable, and drainage should be established. If the incision is delayed, the patient's toxemia becomes alarming, and the pus burrows into other lobes or even to the areolar tissue beneath the breast. The site chosen for the incision should be directly over the abscess, and extend radially from the nipple to avoid severing the lactiferous tubule. The incision should extend at least a half-inch on either side of the abscess, as it is inclined to early closure. The finger which is introduced into the cavity explores and breaks down any septa found walling off other pockets of pus. In this way, separate incisions for adjacent abscesses are avoided. Gentle pressure may be applied to the breast to aid in evacuating the pus. Forceful evacuation, however, is followed by a severe chill and a sharp rise in temperature, and should be avoided. After all the septa have been destroyed, one or more rubber tissue drains, of liberal size, are placed in the abscess. They are left undisturbed for forty-eight hours, and are then gradually withdrawn a little each day. Hot, wet, antiseptic dressings are applied to the breast, and the damage heals with surprising rapidity. This operation is an extensive and exceedingly painful procedure and, for the sake of the patient's comfort and the thoroughness of operation, should never be attempted with local anesthesia alone. Ethylene gas is the anesthetic of choice for this operation.

There remain to be considered a few other problems, such as inverted nipples, the occasionally encountered necessity for drying up the milk,

and the very frequent problem of deficient secretion. Concerning inverted nipples there are two conflicting interests: that of the mother and that of the child, and both are of major importance. Pediatricians are unanimous in the opinion that the results of no other food equal or approach in freedom from nutritional disturbances, those given by milk from the mother's breast. The infant deprived of this food falls victim to a rapidly progressing acidosis. Pediatricians also tell us, and vital statistics support them, that the first ten days of the infant's life comprise its most hazardous period; that after having passed the dangers of this time, it has more or less mastered its completely changed environment and more readily responds to therapeutic and dietary measures. On the other hand, we must consider the mother with inverted nipples. Allowing her baby to nurse most probably will initiate mastitis and breast abscess. To meet this extraordinary situation, I favor a plan of compromise. The milk is taken from the breast by means of a sterilized hand pump, or if the patient is in a well-equipped maternity hospital, by the electric pump, and given to the baby by bottle. This is continued for twelve days. Meanwhile, one of the artificial foods is being gradually substituted for mother's milk. At the end of this time the infant is given artificial food only, and the breasts are dried up as a prophylactic measure to forestall the inevitable abscess. This plan gives the infant his most favorable food during his critical period. But it is not without danger to the mother, for with the slightest break in aseptic technique, mastitis may develop and end the entire procedure. However, it is always worthy of trial; and with the aid of intelligent nurses, will give excellent results.

Other than as a prophylactic measure in the case of inverted nipples, there are several indications for drying up the breast. It may be occasioned by disease of the mother, as a severe anemia or pulmonary tuberculosis. It becomes necessary following death of the infant or stillbirth. The means of accomplishing this have changed considerably in the past few years. Formerly, it was a tedious and painful process, characterized by alternate periods of engorgement and of the emptiness following massage or pumping. Mastitis was a frequent complication. With our present plan of treatment the worst part is over within twenty-four hours. A wide tight binder, which both supports and compresses the breasts, is applied. Over this, ice bags are applied and allowed to remain in place without intermission. The patient's liquid intake is restricted, and a saline purge is given. In six or eight hours the breasts become painful, and this symptom may be relieved by one-half grain of codeine. A second dose is seldom necessary, for within a few hours the breasts become softer and the pain disappears. Massage and pump are not permitted. The ice bags are removed after twenty-four hours, but the binder is left in place for several days. This plan of treatment has the advantages of being quick, efficient, and in this series, has not been followed by abscess or mastitis.

A deficient secretion of milk is a complaint by no means uncommon. It may be a temporary or a permanent phenomenon. Very often following a strong emotional upset in the mother, it is noted for two or three days. The permanently deficient type is usually noted in successive generations of mothers. Concerning the relief of this condition we know very little. Drugs and glandular extracts have been of no value. Dietary measures, while helpful, give only uncertain results. Overfeeding causes a gain in weight of the patient, and an actual decrease in quantity of milk. Hence, the daily caloric intake should be that normally required for the woman, plus not more than six or seven hundred calories for milk. The fluid intake should be generous. Stimulation of the breast by massage is no longer recommended by Dr. J. B. DeLee,* who has found stimulation by the electric pump more satisfactory and less dangerous. The obstetrician cannot give up the time required for massage and, if administered by a nurse or neighbor, it usually results in a severe mastitis. The dairyman knew long before the physician that repeated incomplete emptying of the gland caused a progressive decrease in the quantity of milk secreted. It is logical, then, to empty the breast further by means of the pump after the infant has ceased his nursing efforts. This measure sometimes gives surprisingly good results. However, with the diet properly regulated, there is probably no stimulant as good as the vigorous nursing of a hungry infant.

In conclusion, I wish to say that the principles expressed in this paper are based on observation of eleven hundred consecutive cases delivered by Drs. H. W. Johnson and R. A. Johnston and myself. That they are of value is evidenced by the fact that in the eleven hundred mothers, abscess of the breast developed only nine times—an incidence far below the average. Even this ratio will be improved, most likely, with the continued use of sodium hypochlorite solution as a breast antiseptic. The salient features which have been expressed are cleanliness, support, alertness on the part of the physician, and the avoidance of trauma. At no time is massage of the breast justifiable. Closer observance of these widely neglected principles will give results not generally attained in the care of the lactating breast.

1620 MEDICAL ARTS BUILDING.

*Personal communication from Dr. J. P. Greenhill.

SECONDARY ADENOCARCINOMA OF THE OVARIES FROM THE JEJUNUM

BY MELVIN A. ROBLEE, B.S., M.D., ST. LOUIS, MO.

(From the Department of Obstetrics and Gynecology, Washington University Medical School)

MUCH has been written on the subject of scirrhus carcinoma of the ovaries secondary to some gastrointestinal carcinoma. The Krukenberg's tumor of the ovary, with its special pathology, has long been recognized as secondary to gastrointestinal cancer. Major has made quite an exhaustive study of this type of tumor and concludes that whenever reference to it in the literature as a primary carcinoma has been made, the observer has failed to definitely exclude a gastrointestinal primary site.

Taylor has reviewed the literature of malignant and semimalignant tumors of the ovary. He reports scirrhus carcinomas of the ovaries secondary to some gastrointestinal carcinoma that either show or do not show a resemblance to the peculiar signet ring scirrhus type called Krukenberg. Several cases of secondary carcinoma have occurred in cystic or papillary ovarian structure, and he feels that the presence or absence of "signet ring" pathology has little to do with the subject of metastatic gastrointestinal ovarian malignancy.

Stone, in discussing metastatic carcinomas in the ovary, states the route of metastasis is most often by direct extension through the retroperitoneal lymph nodes by permeation, or by retrograde transportation, or by peritoneal implantation. The latter is quite common during the period of active functioning of the ovaries because of circulatory changes and trauma to the surface from ovulation. This is most often seen when there is peritoneal metastasis particularly in the culdesae. Experimentally it has been shown that carbon particles introduced into the upper peritoneum will gravitate to the culdesae, and collect on the surface of the ovaries.

Stone also points out that many observers state that there is a continuous course of lymphatic invasion through the lymph vessels and nodes behind the structures of the upper peritoneal cavity into the retroperitoneal lymphatics on both sides of the aorta to the enlarged lumbar nodes and then, by a reverse current in the spermatic lymph vessels, the cancer cells are carried through the hilum into the ovaries. By this route there might be no peritoneal metastasis.

Schaeffer thinks metastasis may occur along the reverse route and cites a case to substantiate his view.

Soper in 1909 reviewed the work of Schlieps and added two cases of primary carcinoma of the jejunum and ileum. Schlieps collected 38 cases from 1867 to 1908 and to this number added 5 cases from the Breslauer Surgical Clinic, totaling 43 cases. Nineteen of these were carcinoma of the jejunum. Soper found 12 cases of carcinoma of the small bowel not mentioned by Schlieps. Several of these were in women but there is no report of metastasis. Soper again in the *Journal of the A. M. A.* (92: 286, 1929) reports a case of an annular carcinoma about ten inches below the duodenojejunal junction. The patient died of metastasis six months after operation for resection.

In view of what has already been written on secondary carcinoma of the ovaries, I believe that a report of a case of true adenocarcinoma of the ovaries that was secondary to an adenocarcinoma of the jejunum would be of interest, especially since there was no other metastatic cancer. Carcinoma of the jejunum is a very rare malignancy. That this rare type of gastrointestinal carcinoma should metastasize in its true form to the ovaries in which there was neither cystic nor papillary changes present is of special teaching significance, particularly as the endometrium, tubes, and cervix showed no cancer.

A white woman thirty years of age presented herself with a complaint of dysmenorrhea, constant heavy dragging sensation in the pelvis, a loss of weight of from 10 to 15 pounds in the past eight months, and chronic constipation. This

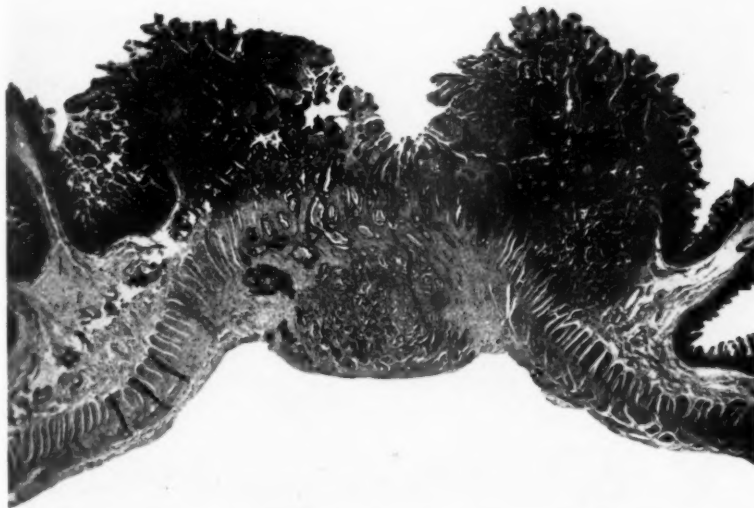


FIG. 1.—Low power microscopic view of the adenocarcinomatous lesion in the jejunum.

patient had been under medical supervision from time to time and had gained a few pounds in the past two months, but the dysmenorrhea had increased. She had had 4 living children, the youngest was three years of age, also one spontaneous miscarriage of about two and a half months' gestation, one year before the present illness. There was no pathologic gastrointestinal history of any sort other than the chronic constipation. The past history was irrelevant except that the 5 pregnancies had been close together and that the patient said she seemed progressively weaker with each pregnancy.

Pelvic examination showed the outlet relaxed, slight cystocele and rectocele. Cervix enlarged about two times, bilaterally lacerated, chronic cervicitis with eversion and erosion. The uterus was apparently anteflexed and pushed forward by a mass occupying the culdesac. The mass and uterus were freely movable together with the cervix as a single unit. The adnexa could not be palpated. The impression was of an ovarian cyst or myoma of uterus.

The patient was again seen some three weeks later after a very painful and

more profuse flow which lasted six days. The usual duration was four to five days.

Pelvic examination showed that the mass had now risen out of the culdesac. Together with the uterus it formed a nodular structure freely movable in the pelvis as a unit with the cervix. The tumor now reached to within about two fingers of the umbilicus. There was no free fluid in the abdomen, no marked tenderness or induration. Hospitalization for hysterectomy was recommended for the following week.

Five days later I was called to see the patient in her home because of severe upper abdominal pain, nausea, vomiting without a bowel movement for the past twenty-four hours. Abdomen distended and rigid; no palpable mass except the lower abdominal mass already described. Pulse was rapid and temperature normal.

The patient was hospitalized at once. After enemas the patient had several large bowel movements. All the nausea, abdominal distention, and rigidity dis-

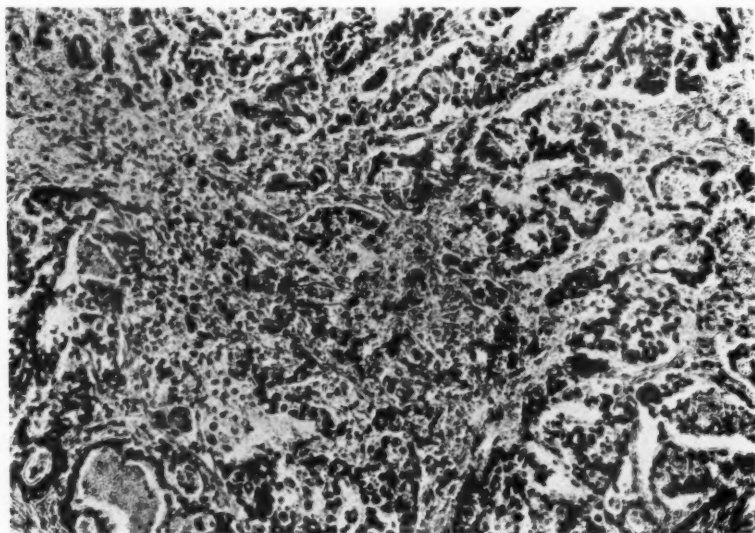


Fig. 2.—High power section through adenocarcinomatous lesion in the jejunum shown in Fig. 1.

appeared. The patient began to have vaginal bleeding with cramps although it was ten days before her expected menstruation.

A laparotomy was performed the following morning. The tumor mass was made up of a bilateral adenocarcinoma of the ovaries. The right ovary was about the size of a grapefruit, quite adherent to the uterus and several loops of ileum. The left ovary was only about one-half as large as the right and was also somewhat adherent to the uterus. The right ovary was mostly solid but contained a mass of necrotic hemorrhagic soft substance. The right ovary and tube were first removed with some difficulty because of the intestinal adhesions and the partial interligamentous nature of the tumor. Then the left tube and ovary together with the uterus and cervix were removed. The abdominal wall was closed with drainage. There was no free fluid or evidence of peritoneal metastasis.

The postoperative course was relatively uneventful for the first four days. Fluids were retained well. The bowels had moved and the patient had taken a soft diet. A blood transfusion had been given on the third day as a supportive measure. On the fifth day the patient suddenly began to have fecal vomiting and marked abdominal distention. Enemas were ineffectual, and the patient's temperature went

to 104° F. The condition grew steadily worse, large amounts of fecal vomiting continued. The abdomen remained soft but distended. The abdominal wound was clean and draining only a clear serosanguineous fluid. Clinically there was no evidence of peritonitis. The apparent intestinal obstruction continued. Under local anesthesia a rubber tube was placed into a loop of distended bowel and sutured with a triple purse string. Another blood transfusion was given. For a few hours the acute symptoms seemed relieved but the temperature went up to 107.5° F., and the patient died the following day.

Postmortem examination showed a low grade acute pelvic peritonitis without pus formation. A few small patches of fibrinous exudate were found on two loops of the ileum. When the jejunum was removed a crescent-shaped hard annular growth was noted in the wall of the bowel about ten inches below the duodenum. On section this proved to be a hard area of adenocarcinoma which had ulcerated into the lumen of the gut and was covered only externally by a thin layer of

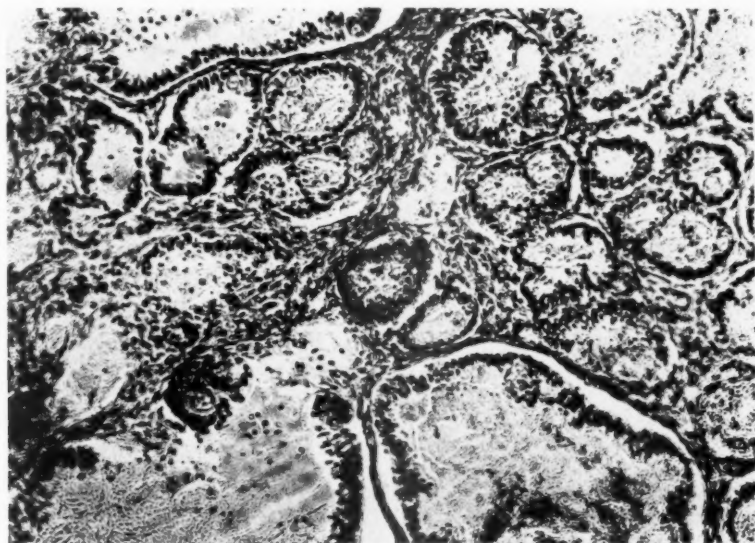


Fig. 3.—High power microscopic section through a typical area as found in the right ovary.

peritoneum. There was no evidence of any other carcinoma. There was no metastasis. Several small mesentery glands were sectioned without showing any carcinoma.

The microscopic sections from the jejunum and from the ovaries were strikingly similar. Both were adenocarcinoma of an intestinal type. The sections from the ovaries showed none of the Krukenberg pathology. The ovaries were solid tumors of a medullary adenocarcinoma type. The right ovary contained a large amount of necrotic, hemorrhagic brain-like substance but did not show cystic or papillary changes. The left ovary was mostly solid. The endometrium of the uterus showed no carcinoma. There was no carcinoma of the tubes. The cervix showed only a chronic cervicitis.

The following points should be summarized in conclusion:

1. Carcinoma of ovaries (bilateral) is so often secondary to some gastrointestinal cancer that every effort should be made to discover the latter before operation upon the pelvis is undertaken.

2. Krukenberg tumors are secondary to gastrointestinal carcinoma and are of a peculiar pathology; signet rings in a scirrhus carcinoma.

3. Other secondary types of ovarian cancer to gastrointestinal carcinoma should not be called Krukenberg tumors.

4. The unusual type of adenocarcinoma in the jejunum, recovered in both ovaries without change in type, emphasizes the secondary nature of these ovarian tumors.

This is verified by the fact that the endometrium, tubes, and cervix showed no carcinoma.

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3720 WASHINGTON BOULEVARD.

PRIMARY CARCINOMA OF THE VAGINA FOLLOWING A BALDWIN RECONSTRUCTION OPERATION FOR CONGENITAL ABSENCE OF THE VAGINA

By R. N. RITCHIE, M.D., ROCHESTER, N. Y.

(From the Department of Gynecology and Obstetrics, University of Rochester School of Medicine and Dentistry)

IN AUGUST, 1928, a young married woman, aged twenty-six years, presented herself to the Out-Patient Department of Gynecology of the Strong Memorial Hospital complaining of pain in the lower abdomen, discharge from vagina and rectum of three months' duration. Menstrual period normal in every respect. Previous health excellent. It was learned that she had been treated by her family physician for several months and had been told she had an abscess in the vagina which had been opened and drained several times. The last incision had been made into the rectum with the hope of promoting better drainage. All the above facts were obtained from the patient who was very cooperative and intelligent.

She was well nourished, of good stature, no loss of weight. Heart and lungs negative. No evidence of any palpable tumor mass. The scar of a midline incision was noted extending from the umbilicus to the symphysis, of which no mention was made in the history by the patient. Upon further questioning about the nature of the operation, all that could be obtained was that she had an operation at the age of twelve years and was very vague as to what had been done. This operative scar was disregarded for the moment with a hope of obtaining further data, as she gave us the name of the hospital at which the operation was performed and also the surgeon. Urine examination was negative. Blood picture was normal. Blood Wassermann was negative.

Pelvic examination at this time showed the vulva to be nulliparous and healthy. Urethra and Skene's tubules negative. Bartholin glands negative. No abnormal anatomic changes noted about the vulva, a point to be remembered on account of further data obtained at a later date. Vagina normal in size. About 2 cm. inside the fourchette was a mass the size of a large walnut, arising from the

posterior wall of the vagina, obliterating the lumen of the vagina to such an extent that it was difficult to admit an index finger above the mass without causing great pain and discomfort to the patient. For this reason it was impossible to examine the cervix, uterus, or appendages with any degree of accuracy.

The mass was friable, bled easily and showed macroscopic evidence of degenerative changes toward its center. It was tender and there was considerable induration on both sides along the lateral walls of the vagina. Pus could be expressed from the center of the mass, particularly with a finger in the rectum. Rectal examination showed the mass protruding into the lumen of the bowel but there did not seem to be any definite ulceration of the rectal mucosa, only a dimpling of the mucosa.

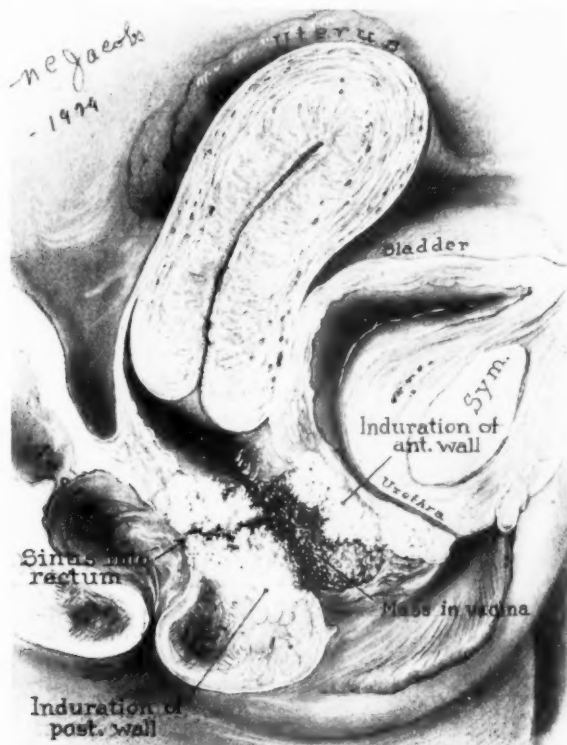


Fig. 1.—Diagrammatic drawing of the ulcerated mass in the vagina.

This apparently represented a sinus between the rectum and vagina which had been artificially made previous to promote better drainage.

Tentative diagnosis was made at this date of a malignancy of the vagina. The patient was admitted to the hospital for biopsy, proctoscopic examination, and further study.

After admission a more careful examination of the pelvis was made under anesthesia. Above the mass the vagina was normal. There seemed to be some shortening of the posterior fornix. The cervix was that of a normal nulliparous woman. The uterus was in good anterior position, normal in size, and freely movable. The appendages were normal. A biopsy was done at this time and serial sections were made.

After the diagnosis had been made, we were able to obtain more definite information concerning the midline scar below the umbilicus.

In November, 1913, at which date the patient was thirteen years old and attending school, she presented herself to Dr. Douglas Ward of the Rochester General

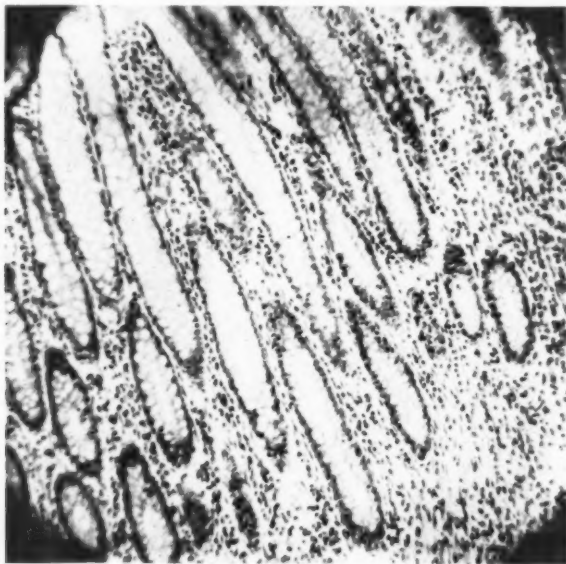


Fig. 2.—Showing characteristic goblet cells of the gastrointestinal tract. The presence of these cells was confusing as it was difficult to determine or explain their presence. Later information cleared the situation.

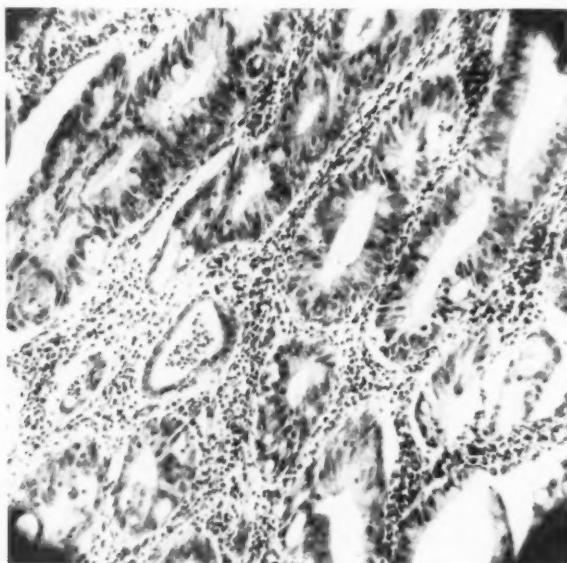


Fig. 3.—Shows definite adenocarcinoma.

Hospital with the following symptoms: Cramp-like pains in the lower abdomen, periodic attacks of vomiting and painful urination. These attacks gradually subsided and the patient was free from all symptoms. The same symptoms returned

again in five or six weeks, which suggested to Dr. Ward that these symptoms had some relationship to the periodicity and suggested some obstruction to the menstrual function, for up to this time she had never menstruated. At this time a vaginal examination was done and it was found that the patient had a congenital absence of the vagina.

She was admitted to the hospital February, 1913 and a résumé of the operation was as follows:

"A careful dissection was made between the bladder and rectum. At a depth of three inches from the incision of the mucous membrane, the cervix was reached. It was grasped with a tenaculum and pulled down, the connective tissue around it being pulled back until the external os of the cervix was exposed. A dilator was inserted into the cervix and about one ounce of black, tarry blood escaped from the uterus. The uterus and vaginal dissection were packed.

"Six days later an incision was made in the midline between the umbilicus and symphysis. A loop of small intestine twelve inches long, proximal to the cecum

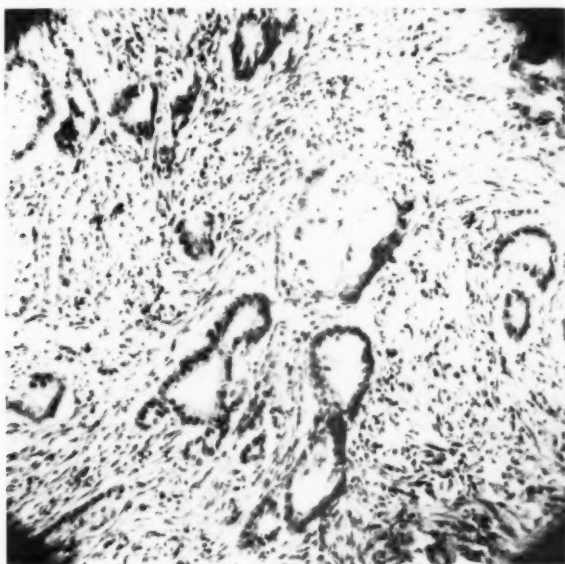


Fig. 4.—Same condition as Fig. 3, considerable fibrous tissue formation.

was located. The loop was isolated from the rest of the intestine but was left attached to its own mesentery. The distal end of the loop was closed by a purse string suture of silk and half of a Murphy button was dropped into the short end of the ileum attached to the cecum. The other end of the loop was cleansed but not closed and the other half of the Murphy button was introduced into the proximal end of the ileum. The isolated loop was freed by making radiating incisions into the mesentery at each end to a depth of three inches, which allowed the loop to be pulled into the pelvis without cutting off its blood supply. Placing together the two halves of the Murphy button restored the continuity of the small intestine. The cut edges of the mesentery were sutured together, closing the gap in the mesentery and covering the raw edges.

"The peritoneum was opened into the cavity which had been made at the first operation and with a forceps, drew down the double loop of intestine to the vulva, stitching the opening around the cervix. Difficulty was experienced in placing sutures around the cervix and the open end of the bowel. The abdomen was

closed. The loop of intestine was opened at the vulva and the edges stitched to the surrounding tissue of the vulva (as previously stated, we were unable to note any defect at the vulva). Both ends of intestinal loop were packed with iodoform gauze. One year later the septum between the two loops of intestine was crushed."

This operation was performed as described by Baldwin, with a few personal deviations.

Following the operation the patient's menstrual function was normal, with no dysmenorrhea.

Six years later the patient married and her sexual history was normal, although she never became pregnant.

Dr. Ward stated at the end of his article, which was published in *Surgery, Gynecology and Obstetrics*, November, 1918, "The case is of unusual interest and the first case on record in which a vagina has been successfully made and connected with a functioning uterus so that regular menstrual function has been established."

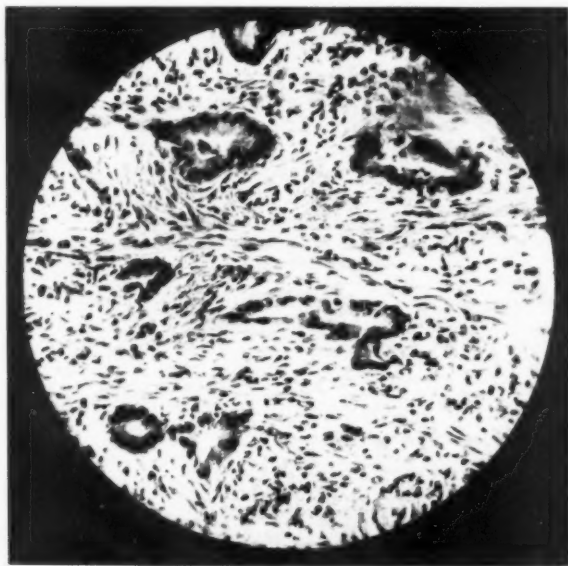


Fig. 5.—High power, showing much the same arrangement as Figs. 3 and 4.

Dr. F. J. Baldwin, Columbus, Ohio, originator of the reconstructive operation for congenital absence of vagina, was given a résumé of the case. His reply was, "That he never heard of such a result from a physiologic or pathologic viewpoint. He could not see how there could be any malignancy except as it might arise in general principles, without regard to the operation."

The case is presented in the manner of coincidents, as we had to confront the problems which were hidden.

Our treatment was one of palliative measures. She was given three doses of radium, fifty milligrams varying in time from three to eight hours. The time elapsing between treatments was three weeks and deep x-ray therapy over the pelvis was given after radium treatments.

The patient's condition improved slightly for a time, but gradually the loss of weight, weakness and terrific pain after bowel movements increased. The generalized lower abdominal pain became more marked. The growth extended very rapidly and the greater part of the rectovaginal septum became involved. It was cartilaginous in character and had completely lost its elasticity. The tumor

extended along the lateral walls of the vagina and involved the anterior wall of the vagina and bladder.

December, 1928, five months after the first visit, the patient developed signs of an intestinal obstruction and a colostomy was done with the purpose of giving temporary relief. The pelvis was explored at this time and there was found to be a mass of carcinomatous metastases. The colostomy gave temporary relief for a short period. The patient died January 27, 1929, six months after her first visit to the hospital. Autopsy was refused.

We are unable to find any references in literature of a similar case.

SUMMARY AND DISCUSSION

The history of a patient upon whom the Baldwin operation for the creation of an artificial vagina was performed thirteen years previously, is presented. Carcinoma subsequently developed in the newly created vagina. So far as I am aware, this is a unique occurrence. A number of interesting questions arise on which one may speculate, but concerning which no positive conclusions are possible.

Did the carcinoma develop as a result of the operation or would it have occurred had the bowel remained in its normal situation? It is obviously impossible to answer this, though one might make the comment that carcinoma of the small bowel is a very unusual pathologic lesion at this age.

Inasmuch as practically all of those women who present complete absence of the vagina usually present such defective development of the internal genitalia that menstruation is impossible, the question arises as to the nature of the original defect for which the Baldwin operation was performed. Was it a true absence of the vagina or did it represent a gynatresia acquired before puberty and resulting in occlusion of the vaginal tract with retention of the menstrual flow?

As this is the first example of its kind, one cannot fairly say that the Baldwin operation predisposes to malignancy.

SEX OF CHILDREN AFTER SINGLE OOPHORECTOMY

BY JOHN R. HARGER, M.D., CHICAGO, ILL.

THE question of sex determination as well as the cause of tubal pregnancy, make the following case history of more than passing interest.

Mrs. R. A. T., now aged forty-two, after having an ectopic pregnancy with rupture in 1915 gave birth to five boys.

Six weeks after rupture of a tubal pregnancy, the patient came under my care, when the right tube, ovary, appendix, a living functioning placenta with a large amount of liquor amnii were removed, together with a large, partially organized hematoma and a two months' embryo was taken from the culdesac. Each pregnancy, delivery and puerperium have been normal and without any unusual event other than after the fourth delivery; this child died on the fifth day from an undetermined cause. No postmortem permitted. Dates of deliveries were as follows: Aug. 1, 1915, Jan. 8, 1918, Oct. 28, 1920, Sept. 12, 1922, and Jan. 11, 1929.

A study of this case reveals several interesting points. The inflamed appendix adherent to the tubal mass after the ruptured ectopic may have been the cause of the tubal pregnancy. Five males from the left tube and ovary suggest the possibility of each ovary giving rise to separate sex. The father of these males is one of six boys born consecutively. His mother gave no history of pelvic pathology. The mother of these children had no brothers and only one sister. All of these males have shown a very marked resemblance, at the time of birth, to the maternal grandfather.

25 EAST WASHINGTON STREET.

A STUDY OF VARIOUS LIVER FUNCTION TESTS IN NORMAL PREGNANCY*

BY R. C. CROSS, M.D., NEW ORLEANS, LA.

(From the Department of Obstetrics, Graduate School, Tulane University of Louisiana)

THE liver is the largest, the most abused, the most neglected, one of the most important, and the least understood organ of the body. It has manifold functions, the most important of which has to do chiefly with the anabolism and catabolism of proteins. It also exercises a detoxifying action, making various noxious substances harmless by conjugation, splitting, or other processes. It stores carbohydrates in the form of glycogen, which it then changes to sugar and supplies to the body according to its requirements. It is concerned in some way with blood coagulation. It forms urea. Finally, it forms and secretes bile, which, in the presence of pancreatic juice, aids in fat absorption, plays a part in protein digestion, and stimulates peristalsis.⁷

As is well known, the liver suffers in many, and perhaps all, of the toxemic disturbances of pregnancy, especially those of the last trimester. Pathologic changes of a degenerative type are found,¹⁴ and the majority of cases of acute yellow atrophy of the liver which have been reported occurred in pregnant women.⁷² Even in normal pregnancy marked changes are frequently apparent, and it is claimed that the organ is enlarged and pushed upward in many healthy gravidæ. Mann and Higgins,⁴⁴ working with small laboratory animals, found that in pregnancy, especially near term, the emptying time of the gall bladder is decidedly increased; and, in their opinion, this fact suggests that in normal pregnancy some impairment of liver function always exists, even though it is not great enough to be demonstrated by any test as yet devised. A few workers with liver function tests, however, as will be noted below, report that some evidences of liver dysfunction in normal pregnancy are shown by a few of the tests employed.

It must be borne in mind, as Ray⁵⁴ points out in his study of liver function tests, that, unlike most other specialized organs of the body, the liver possesses a remarkable ability of regenerating and prolifer-

*A digest of a thesis submitted to the Faculty of the Graduate School of Tulane University in partial fulfillment of the requirements for the degree of Master of Science in Obstetrics, April 1, 1928.

The majority of the tests on which this study is based were made in the laboratory of Touro Infirmary. The others were made in the biochemical laboratory of Tulane University, under the direction of Dr. Willey Denis. The preparation of the necessary reagents was done in Dr. Denis' laboratory and under her direction.

The scheme for the various tests and their application to the special patients were supervised by Dr. E. L. King, Professor of Obstetrics in the Graduate School of Tulane University.

The work herein reported was aided by a grant from the David Trautman Schwartz Research Fund of Tulane University.

ating in the face of the most profound insults. Experimenting with dogs, he found that as much as half of the liver substance could be destroyed by chloroform poisoning, and yet complete restoration would follow. He adds that these findings corroborate Roux's statement that the liver is the most silent of organs if only a moderate fraction of its cells are healthy. Ray also points out that since the functions of the liver are so various and since complete knowledge of them is still lacking, no one test is capable of measuring liver function as a whole; and all tests, therefore, must be interpreted with considerable caution.

Diamond¹⁶ makes the same point, that since the liver is a complex laboratory with metabolic, excretory, and detoxicating functions, it is unreasonable to expect any one functional test to demonstrate the capacity of the liver as a whole. He believes that the only rational method is to utilize several of these tests on each patient, and this plan has been followed in this study. Diamond also points out that, inasmuch as four-fifths of the liver substance can be removed from an experimental animal and function still be preserved, it is well to remember that the human liver possesses the same ability, at least in some degree, and that no test can therefore be taken as an exact estimate of the amount of damage which has occurred.

The functions of the liver have been studied in many ways, and a large number of tests have been devised. Space does not permit of a consideration of them all, nor is it necessary to give the details of the various tests employed. Two dye tests are popular; in one, rose bengal is employed, according to the method developed by Delprat and his coworkers;¹⁵ in the other, worked out by Rosenthal and his collaborators,^{58, 59, 60, 61} phenoltetrachlorophthalein (and more recently bromsulphthalein) is employed. Intravenous injection of the dye is performed, and specimens of blood taken at stated intervals are examined for dye retention by colorimetric methods. Retention beyond the time ascertained to be normal is interpreted as evidence of liver damage. However, Ottenberg, Reuben and Abramson⁵⁰ and Rosenau⁵⁶ state that the use of the latter dye (phenoltetrachlorophthalein) is not free from danger, especially in the presence of an already damaged liver. Widal's hemoclastic crisis test, the van den Bergh, Fouchet, and icterus index test on the blood serum, the study of the sugar content of the blood and the urine after the ingestion of various sugars (especially levulose) by mouth, Schlesinger's test for excessive amounts of urobilin in the urine, and the employment of Ehrlich's aldehyde reaction for the detection of pathologic amounts of urobilinogen in the urine, appear to be the most popular and most useful of the various other tests that have been proposed.

A review of the literature shows that a majority of the studies on liver function deal almost exclusively with abnormal cases, and this is particularly true of work that has been done on pregnant women. Several papers have been published re-

porting investigations in toxemic patients, but only a few of these observers briefly mention their findings in normal pregnancy. Walthard^{74, 75} states that in uncomplicated gestation there tends to be a hyperglycemia and an impairment of the storage ability of the liver, as well as an increase in the urobilin content of the urine. Graham,²⁷ writing of his experimental work with chloroform as a liver poison, states that somewhat similar changes occur during pregnancy, and especially in the last trimester, when, because of the demands of the fetus and placenta and because of the increase in the waste products to be detoxified, the maternal liver is subjected to a most unusual strain. P. F. Williams⁷⁷ subscribes to this view. Heyn and Messtorff⁷¹ found the Widal hemoclastic test to be positive in one-third of a series of healthy women in the last month of pregnancy, and Couinaud and Clogne¹¹ report similar results. On the other hand, Strauss, working with levulose, found no evidence of liver dysfunction in normal pregnancy, so far as this test was concerned. As these reports are merely incidental, and as no detailed study of the response to the various liver function tests in normal pregnancy has so far been reported, it appeared to me that it would be worth while to conduct such an investigation for the purpose of determining whether these patients would show any deviation from the normal readings. It would seem that this work would be of value as a basis of comparison in studies of liver function in the toxemias of pregnancy.

I might mention at this juncture that studies on the function of the liver in the toxic states peculiar to pregnancy have been published by Walthard,^{75, 76} Didier and Philippe,¹⁷ P. F. Williams,⁷⁷ Smith,⁶⁷ Naujoks,¹⁹ Krebs and Dieckmann³⁷, Rosenfield and Schneiders,⁵⁷ Berkeley, Dodds and Walker,⁴ King,³⁵ and Siegel.⁶⁶ Various tests were made by them, and it appears from a survey of their work that the dye test of Rosenthal (phenoltetrachlorophthalein and later bromsulphthalein) is of particular value, especially in the toxemias of late pregnancy, being generally found to be positive in a degree corresponding to the clinical condition. The van den Bergh test is as a rule positive in the severer cases of hyperemesis gravidarum, but is uniformly negative in the toxemias of the latter months. No report of the use of rose bengal in pregnancy was found in the literature. The other tests employed by these various authors appear to be of doubtful value.

In this investigation the following tests were used: the bromsulphthalein test, according to the technic of Rosenthal and White;⁶⁰ the levulose tolerance test, according to the method of Spence and Brett;⁶⁸ the hemoclastic crisis of Widal, as described by Gonzalez and Karr;²⁶ the van den Bergh test, according to the technic of the originator;⁷¹ the Fouchet test, as described by Friedman and Straus;²⁴ the icterus index, according to the technic of Bernheim;⁵ and the Ehrlich and Schlesinger tests, as described by Berkeley, Dodds, and Walker.⁴ One hundred patients were studied, of whom sixty-one were entirely normal on gross examination, though naturally a minor pathologic condition, not sufficient to influence the pregnancy, was probably present in several of them. In all of these sixty-one patients the Wassermann reaction was negative, though this, of course, does not necessarily mean that they were free from luetic infection. Urinalysis, done routinely in each case, was normal throughout. For purposes of comparison, twenty-eight abnormal patients were studied, whose pregnancies were complicated by dental caries and pyorrhea, pyelitis, tonsillitis, syphilis,

or one of the various types of toxemia. Tests were also performed on eleven gynecologic patients as controls. A total of 1474 tests were made.

No patient was seen before the third month of pregnancy, and some did not report to the clinic until late in gestation. Specimens of blood and urine were obtained for the tests on the second visit, usually one week after the first, and the tests were repeated at monthly intervals until delivery. A few of the patients, who were admitted to the hospital, were studied during the labor and through the puerperium. Five patients in the normal group had not delivered at the completion of the study; but the pregnancies were progressing favorably, and uncomplicated deliveries were anticipated. Two of the patients in this same group were normal until the last month of pregnancy, when, during the last week, both exhibited symptoms of mild toxemia. In each instance this cleared up before delivery, and the puerperium was without incident.

In two of these cases specimens of blood were obtained from the cord at delivery and examined, with negative results, by the icterus index,

TABLE I

Normal pregnancy	61 cases
Abnormal pregnancy	28 "
Gynecologic	11 "

TABLE II

PATIENTS	WHITE	COLORED
Gynecologic (all sterile)	2	4
Primiparae	7	33
Multiparae	11	43
Multiparae with previous normal pregnancies	6	40
Multiparae with some previous abnormal pregnancies	1	7

TABLE III. TIME OF TESTS

From second trimester to labor	80
During parturition	6
10 days to 6 weeks postpartum	15
Gynecologic cases	11

TABLE IV. NUMBER OF TESTS MADE ON NORMAL PATIENTS

	1 TEST	2 TESTS	3 TESTS	4 TESTS	5 TESTS
Primiparae, white					1
Primiparae, colored	4	12	4	2	
Multiparae, white	4	1	1		
Multiparae, colored	14	7	7	2	2
Total	22	20	12	4	3

van den Bergh, and Fouchet tests. Four patients examined during labor showed a trace of bromsulphthalein retention, but all other tests made on them were negative.

In all of the normal patients studied during pregnancy the various tests employed gave uniformly negative results. This does not rule out the possibility of the occurrence of some degree of impairment of liver function; for, as stated above, it is generally agreed that there must be considerable damage before the tests will show positive readings. It is interesting to note that several of the patients had various incidental complications, which, according to the tests, occasioned demonstrable interference with the function of the liver. Thus, three patients with syphilis, inadequately treated before being seen, all gave a positive indirect van den Bergh reaction (nonobstructive jaundice); all had a trace of retention of bromsulphthalein, while in one patient the Fouchet test was slightly positive, and in one the icteric index was 10 (normal 4 to 8). In the fourth patient with syphilis, who had been thoroughly treated, all tests were negative while she was still pregnant. In 4 cases of severe pyorrhea complicating pregnancy, a trace of bromsulphthalein was found in each, and in one instance a positive indirect van den Bergh reaction. In the two patients that were retested three and four weeks postpartum, all tests were negative. In four patients with pyelitis there was dye retention in each (reaching 10 per cent in one case), a positive Schlesinger reaction twice, and a positive indirect van den Bergh reaction once. In those retested after proper treatment or after delivery, all tests were negative. In one patient with severe tonsillitis, there was 5 per cent retention of bromsulphthalein, while all the other tests were negative. The tests were not repeated postpartum. In a case of mitral regurgitation with insufficiency there was a trace of bromsulphthalein retention at the eighth month, with 5 per cent retention during delivery; the indirect van den Bergh test was positive both times. All tests were negative postpartum.

These findings would appear to indicate that the usual wide "margin of safety" is much reduced, for certainly such conditions would hardly affect perfectly normal livers to any appreciable extent. The fact that four patients tested during labor showed a slight retention of bromsulphthalein would point to the same conclusion.

The tests performed on the thirteen patients with toxemias bear out the results previously reported by others. There were four cases of nephritic toxemia, three of severe preeclamptic toxemia, one of eclampsia, and five of mild preeclamptic toxemia. The various tests were positive in differing degrees, the most reliable one being the bromsulphthalein test, which was positive in ten instances, the percentage of retention corresponding fairly well with the clinical picture.

SUMMARY AND CONCLUSIONS

I have pointed out that even in a normal pregnancy, because of the increased demands on the maternal organism, the physiologic processes of the liver are subjected to extra stress. The strain grows more intense as pregnancy advances and is naturally greatest during the last trimester and particularly during labor. Shortly thereafter there is a return to normal conditions. In spite of this added strain, the average liver, beginning its ordeal with no pathologic condition, will function well. On the other hand, a liver already damaged or unfit for this extra task, or a liver involved in pathologic conditions peculiar to pregnancy, will promptly give evidence of dysfunction. Any tests, therefore, which will demonstrate this dysfunction and which, particularly, will demonstrate it promptly, are extremely valuable.

No one test is sufficient to demonstrate liver dysfunction, because of the manifold duties which this organ is called upon to perform. On the other hand, a positive result in any test undoubtedly means that impaired function of some sort is present, even if it is not apparent clinically, and that patient should be observed with special care in order to forestall possible trouble and to detect it immediately when it occurs. It is fair to conclude from the tests performed in this study that, other things being equal, the average liver is entirely capable of withstanding the added strain of pregnancy.

Patients with coincident disease, not of obstetric origin, need very careful watching. Patients with luetic infection, if properly treated, may carry the child to term and deliver spontaneously; but liver damage may result, as was evident in the cases in this series. Pyelitis, tonsillitis, and similar infections which cause a rise in body temperature place an added strain on the liver if the results of these tests are to be accepted, and such patients should be watched from that point of view also.

While this study was undertaken primarily with the idea of studying the liver of normal pregnancy, the abnormal cases give grounds for comparison, and the entire investigation warrants the following conclusions:

1. The bromsulphthalein test is probably the most helpful of all. It is invariably negative in normal cases; but if any retention is shown, complications are to be looked for. It can be employed with impunity, for it seems to produce no ill effects on the patient, immediate or remote.

2. The van den Bergh test is valuable only in occasional cases.

3. The icteric index test is valuable in that positive results point to hepatic insufficiency.

4. The Fouchet, Schlesinger, Ehrlich, levulose tolerance, and Widal hemoelastic crisis tests are not uniformly reliable.

5. All tests, even those whose reliability has been established, should be interpreted with caution, because of the fact that no one test can demonstrate the functional ability or disability of an organ with manifold functions.

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THE BLOOD TEST FOR OVARIAN HORMONE*

SECOND REPORT

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(From the Evans Memorial)

MANY years ago clinical observations demonstrated that the ovary, with its secretion, is the controlling factor in the functional maintenance of the female genital tract. Physiologic experimentation and the clinical use of preparations of the whole ovary or its fractions have proved the presence of an internal secretion. There is, moreover, evidence tending to show the presence of more than one. In spite of these steps forward in the laboratory, and of some rather glowing reports of the results of clinical administration of ovarian preparations, the clinician has been no further advanced in the diagnosis of the functional condition of the ovary.

In 1915 Frank¹ and his coworkers reported the occurrence and extraction of physiologically active substances in the corpus luteum and the placenta. In 1922 a substance with similar reactions was demonstrated in the fluid of the graafian follicle.² In 1925³ the same investigators reported the presence of similar substances in the circulating blood, and in the following year they elaborated a test⁴ for ovarian activity, based on the clinical variations of the blood content of the active substance, corresponding to certain phases in the menstrual cycle.

The elaboration of such a direct test of ovarian functional activity was of importance particularly from two points of view. In the first place, it offered a clinical method of potential value in the diagnosis of patients with menstrual aberrations and ovarian disease. Secondly, it offered a means of studying the functional activity of the ovary in patients suffering from abnormalities of other glands of the endocrine series.

*Read before the Annual Clinical Session, American College of Physicians, April, 1929.

In view of the important potentialities of the test, repetition of the work was undertaken almost two years ago. The results in a series of nonpregnant women have been reported⁵ elsewhere, and the present communication deals with the findings in a series of postpartum cases. In each series, bloods from pregnant patients were used for controls, and the combination of these two series of pregnant bloods more than doubles the group reported as controls in the previous paper.

METHODS

The technic of the test as here used varies somewhat from that described by Frank. These differences have already been described and the reasons for the changes discussed, so a concise description of the several steps will suffice here.

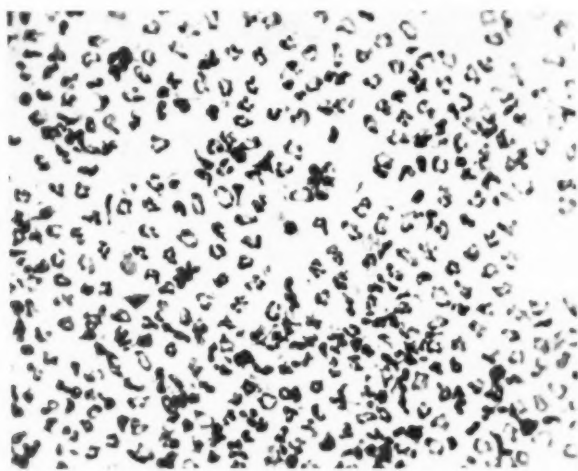


Fig. 1.—Diestrous smear, composed entirely of leucocytes.

Collection and Extraction of Blood.—Forty cubic centimeters of blood from the arm vein are put directly into a Petri dish containing 50 or more grams of pulverized anhydrous sodium sulphate. The blood and sulphate are mixed with a spatula until they form a dry crumbly mass. This mass is put into a mortar and repulverized. The resulting powder is extracted in an Erlenmeyer flask with several fractions of ethyl ether, which together total not less than 175 c.c. Rough separation of each fraction from the blood sulphate mixture is made by decantation. All of the ether fractions are finally combined and sedimented in a centrifuge. The solid portions which have come over in the rough decantations are thrown down into a relatively compact cake, and clean decantation from this is easy. The resultant extract should be a clear, slightly yellow solution. This portion is put into a shallow dish and evaporated to dryness. The yellow lipoid material remaining is emulsified with 2 c.c. of sterile water, or is taken up in like quantity of oil of sesame. The extract is then bottled and stoppered and is ready for injection. All steps in the preparation of the extract after the evaporation of the ether fractions must be carried out under aseptic technic.

Castration of Mice.—The indicator for the test is the castrated female mouse. The work of Stockard and Papanicolaou⁶ on guinea pigs, Long and Evans⁷ on rats,

and Allen⁸ on mice, has shown that there is a definite cytologic change in the vaginal smears of these animals at different stages of the estrous cycle, and that these changes may be used to fix the phase of the cycle in which the smear is made. (Figs. 1 to 4 represent the typical appearance of vaginal smears at different stages of the cycle.) These same investigators have proved that after castration the vaginal smear takes on the characteristics of the diestrous stage of the cycle and maintains them continuously. However, if ovarian tissue be transplanted into the castrated mouse, or if the mouse be injected with some active ovarian preparation, an artificial estrous cycle results. During this cycle the vaginal smears show all the changes characteristic of the normal cycle. This reaction of the castrated mouse to active ovarian material forms the basis of the test.

The castration of the mice is difficult only because of their size. As soon as the operator becomes accustomed to the small tissues and the delicacy required in handling them, the operation offers no technical difficulties. The mice are very resistant to infection and only the minimum of aseptic precaution is required.

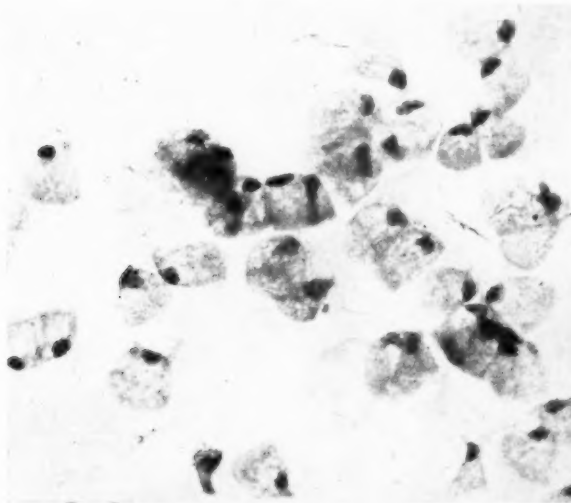


Fig. 2.—Early proestrous smear, showing large numbers of nucleated epithelial cells, small and sharply staining.

Instruments and towels are sterilized and the hands are washed and rinsed with alcohol. The skin of the mouse is disinfected with half-strength tincture of iodine. We have found it unnecessary to shave the skin, and have discontinued the use of depilatories as too irritating. There are two approaches to the ovaries: abdominal and dorsal. We have always used the former in mice, although the latter has been very satisfactory with rats. The abdominal route was chosen because the injections are made under the skin of the back, and it was felt that the operative scar would render them more difficult. The incision is made in the midline of the abdomen, extending well down to the pubes. At the lower end of the incision within the peritoneal cavity will be found a tab of omental fat. Behind this and attached to it is the bifurcation of the uterus. One of the cornua is followed upward to the kidney region, where the cornu ends in the fallopian tubes. This is tremendously convoluted and is in intimate association with the ovary. The mesentery, which attaches the tube and ovary to the lower pole of the kidney, is grasped in a pair of forceps and pulled loose. The ovary, tube, and end of the uterine cornu are then severed. No ligature is necessary unless the mouse is in

estrus and the organs are very much congested. The same procedure is carried out on the other side. The abdomen is then closed in two layers with fine silk. The wound is touched with iodine and covered with collodion. It is important to imbed the stitches in collodion; otherwise the mice bite the stitches and loosen them.

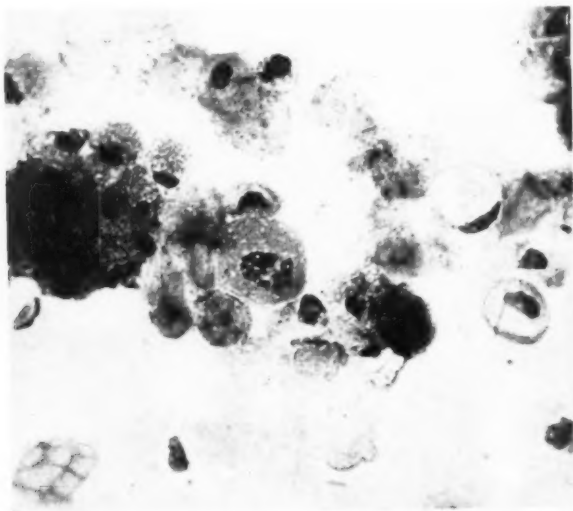


Fig. 3.—Late proestrus, nucleated and cornified epithelial cells. The former are swollen, faintly staining and are evidently devitalized.

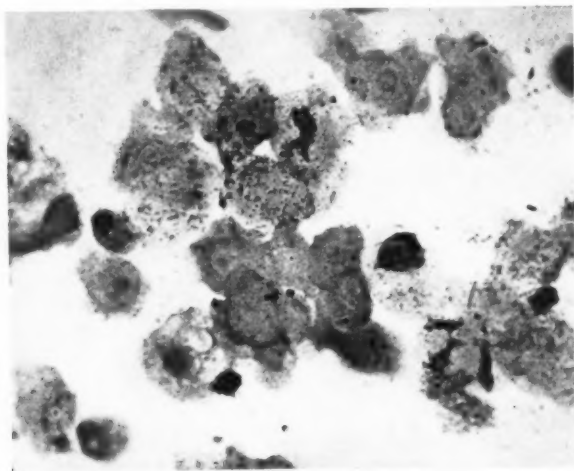


Fig. 4.—Estrus, smear composed almost entirely of cornified cells with rare nucleated cells.

The mortality of the operation is very low, and most of the deaths are due to the anesthetic. The stitches are not removed. Recovery is rapid and the mice are ready for use after a week.

Injections.—The injection of the test materials is made under the skin of the back. The total dose is given in three fractions at intervals of about three hours. During the first series, the extracts were all used in the form of emulsions in

sterile water, with a small amount of sodium carbonate added in some cases to aid in the emulsification. In the present series most of the material has been injected in oil of sesame. This has been used by many observers, and from their reports and our own experience the results are the same as with the emulsions. In one respect the oil is more satisfactory. There are fewer skin sloughs following its use than after the emulsions.

Smears.—All the animals have control smears made on the two days preceding injection and on the morning of the test, to preclude the possibility of spontaneous ovarian activity. Several observers have reported regeneration of ovarian tissue after castration. Test smears are taken on the morning and evening of the two days succeeding the injection and on the morning of the third day. The smears are air-dried and stained with one per cent aqueous solution of thionin. No fixation is necessary though it does no harm. The readings are made according to the scale used by Frank in his work, as no adequate basis for comparison would be obtained otherwise. On this basis, a smear composed mostly of epithelial cells

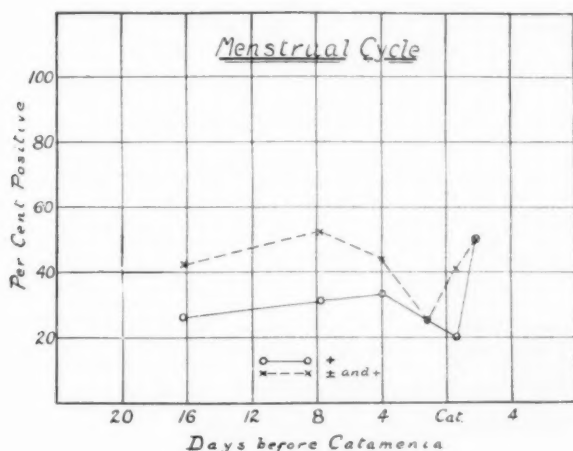


Fig. 5.

would be classed as two-plus, or weak positive; a smear composed only of nucleated and cornified epithelial cells would be numbered three and called threshold; and one composed entirely of cornified cells is numbered four and called strongly positive.

The results previously reported show considerable variation from those published by Frank.⁹ They are shown in Fig. 5 and Table I. Comparison of these figures with those of Frank shows that the trend of the curve is opposed in the two series, and this divergence is most marked in the premenstrual period of the cycle. The obvious criticism would be that some of the changes in the preparation of the blood extracts have made the difference. Such an error, however, would cause either false positives or false negatives, whereas the curve shows a higher number of positives than Frank in the intermenstrual interval, and a lower number in the premenstrual stage. A condition of this kind cannot arise from a single error. In order to show that this

divergence is not the result of too rigid a standard in reading the smears, a second curve has been drawn, which combines the tests which were doubtful with the positive ones. It will be seen that this increases the disparity rather than the reverse. Furthermore, in the premenstrual portion of the cycle, which is the most important part, the addition of the doubtful tests does not change the curve, as at this time the tests gave clear-cut positive or negative results. It is realized, of course, that neither of these series is large enough to be conclusive.

TABLE I. MENSTRUAL CYCLE

DAYS BEFORE CATAMENIA	10-	10-6	5-4	3-1	FIRST DAY CATAMENIA	SECOND DAY CATAMENIA
Number	24	7	5	4	1	1
Per cent	26	30	31	25	20	50
Number	15	5	2	0	1	0
Per cent	16	22	13	0	20	0
Number	55	11	9	12	3	1
Per cent	58	48	56	75	60	50
Totals	94	23	16	16	5	2

During the past six months we have collected data on the disappearance of the active substance from the blood of postpartum patients. The technic of the test has been the same as that described above. The test was controlled by including one or more specimens from pregnant patients in each group of tests. It has been suggested somewhere that the mechanism of the onset of labor might be connected with the dis-

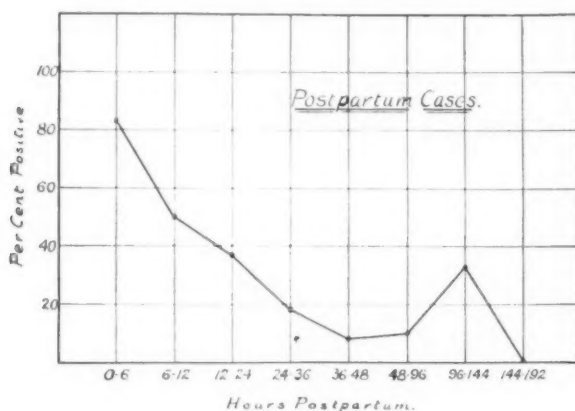


Fig. 6.

appearance of the active substance from the blood. In order to test this suggestion, many of the antepartum bloods in this series were taken during the course of labor or as nearly as possible before its onset. All of these bloods gave positive reactions, and we may assume therefore that the onset of labor does not depend on a disappearance

of the hormone from the blood. This agrees with the findings of Smith,¹⁰ who reported that the concentration of the hormone was greatest just before labor.

The tests on postpartum cases show that there is a rapid and progressive disappearance of the active substance from the blood after delivery of the patient. This applies to the unit dose of 40 c.c. of blood which was used throughout the experiment. The curve of positives plotted in Fig. 6 shows a slight rise in the forty-eight to ninety-six hour period, and in the ninety-six to one hundred and forty-four hour period over the results shown in the thirty-six to forty-eight hour group. I am convinced that these first two are too high, the error being due to the small number of tests involved in each group. The regularity of the curve, with these two exceptions, makes this probable.

TABLE II. POSTPARTUM CASES

HOURS POSTPARTUM	0-6	6-12	12-24	24-36	36-48	48-96	96-144	144-192
Number	5	1	3	4	2	1	2	0
Per cent	83	50	37	18	8	10	33	0
Number	1	1	2	3	4	0	0	0
Per cent	16	50	25	13	16	0	0	0
Number	0	0	3	15	19	9	4	3
Per cent	0	0	37	68	75	90	66	100
Totals	6	2	8	22	25	10	6	3

Although the difference in method is great enough to make comparison difficult, there seems to be no conflict between these figures and those reported by Smith on postpartum bloods. The two positive results which she gives would naturally fall into the positive area of Table II if made to conform to the unit dose of 40 c.c. as here used. Of the several negative results which she reports, some would fall into the negative area of the table and the remainder cannot be allocated because of difference in method. Table II gives the numbers and percentages of the positive, doubtful, and negative tests in the present series.

It must be noted here that this series is unselected. These figures represent the total of all tests performed with the exception of one case where only one-half the dose of blood was obtained. This test was negative and had to be thrown out because there was no way to judge if the result were truly negative or due to the decreased dosage of blood. On the other hand, two tests in which the amount of blood was 30 and 35 c.c. respectively are included in the series. Both were doubtful results but they were included because they furnished evidence of activity.

The following group of pregnant cases is also unselected. The group

from the previous paper has been taken over as originally reported and there are no deductions made among the new group of cases which has been added. Table III and Fig. 7 show the results in this group. Here again the figures given under the fifth and sixth lunar months are probably distortions due to the small numbers involved. Assuming this to be true, the curve confirms in a general way the results reported by Frank, although he shows a higher percentage of positives in the early months of pregnancy.

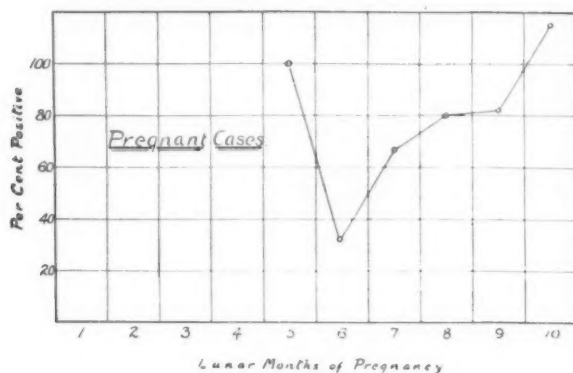


Fig. 7.

TABLE III. PREGNANT CASES

LUNAR MONTH OF PREGNANCY	2	3	4	5	6	7	8	9	10
Number				2	1	6	5	14	39
Per cent				100	33	66	83	82	95
Number				0	1	3	1	3	0
Per cent				0	33	33	16	18	0
Number				0	1	0	0	0	2
Per cent				0	33	0	0	0	5
Totals				2	3	9	6	17	41

CONCLUSIONS

In a series of blood tests performed on postpartum cases, the estrus-producing substance was found to disappear rapidly after delivery from the circulating blood of the patient. This applies to the dose of hormone contained in 40 c.c. of blood.

In a series of tests performed by the same method on pregnant patients, which included 36 cases previously reported, the proportion of positive tests increased with the duration of pregnancy until it reached 95 per cent in the tenth lunar month.

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252 MARLBOROUGH STREET.

PUERPERAL INVERSION OF THE UTERUS. CLASSIFICATION FOR TREATMENT

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BY PUERPERAL inversion of the uterus is meant inversion of the normal uterus subsequent to the birth of the child. Cases of inversion of the uterus complicated by uterine tumors doubtless present a different problem and are not considered here. We are concerned only with classification for treatment.

Puerperal inversion of the uterus is statistically very rare. Williams quotes St. Petersburg and Dublin statistics. We suspect the Russian uterus has better muscle tone than the American, and we are sure that the conduct of the third stage is more carefully carried out in Dublin than in Boston. Several of us together have observed 7 cases (5 of which have been reported together) in the last few years in and about this city and I doubt in this time if together we have seen 250,000 labors or 193,833 deliveries. These figures are given in the above cities without the appearance of a single case. Williams says the diagnosis is easy, and we agree that it should be, but in our experience we have seen it overlooked by well-trained obstetricians. The fact that chronic cases turn up for operation from time to time suggests also that some cases are missed when acute. A study of death certificates in the puerperal state in Massachusetts for the last three years leads me to feel that an occasional case set down as a death from postpartum hemorrhage was an inversion death. This is of course purely a matter of opinion. However, these facts lead to the belief that inversion of the uterus is not so uncommon hereabouts and that proper treatment of the condition warrants this article.

A perusal of the subject in latest editions of excellent textbooks of gynecology and obstetrics (Graves and Williams for example) shows that puerperal inversion falls between the two, the one passing the subject to the other. That it is inadequately covered by both is apparent to anyone who has got up against his first case in consultation some hours after the inversion, and seeking information as to treatment from the books, follows it.

Textbooks classify this condition as acute and chronic. For acute inversion immediate reposition from below is advised. For chronic in-

version a cutting operation on the cervix from below of the Spinelli type is advised. So far as this classification and treatment go one must agree with it. Unfortunately, for practical purposes this textbook classification omits one variety of the condition which is certainly not yet "chronic" and yet is not quite "acute." This is perhaps the most common variety seen, always in consultation practice. As everybody knows and as textbooks sometimes stress, at some time after the inversion the cervical ring tightens. How soon this takes place I do not know but I have reasons to believe that it may occur in a very short time. Following this phenomenon, according to textbook classification, the case is still acute and dilatation of the ring and reposition of the inverted uterus from below are advised. That this can sometimes be done with a patient still alive is probably undeniable. But that this effort probably accounts in a large measure for the high mortality in the condition no one could doubt who has tried it. This procedure is like chasing a greased pig in a poke. While one attempts it to his own manual exhaustion, the patient is prone to bleed freely, usually having bled a great plenty already, and drifts rapidly into a condition of profound shock and hemorrhage. This wholly because of the manual difficulty of replacing the large edematous fundus back through a ring which will not stay dilated, all with a single hand. By the same token, to think of doing a Spinelli type operation at this time in the face of the blood oozing and distorted tissues is to conceive of a very shocking and bloody operation.

As long ago as 1921 (ample time for textbooks to take recognition of it), Huntington¹ devised the operation of abdominal replacement of the inverted uterus. In 1928 Huntington, Irving and Kellogg² described the technic with illustrations and reported 5 cases successfully operated upon by this method.

Shock primarily (as a careful perusal of reference² will show) and hemorrhage secondarily are the immediate dangers of inversion of the uterus. As has been stressed by others it is axiomatic that a successful treatment of any obstetric complication which has already resulted in hemorrhage and shock, as for example, placenta inerceta, placenta previa and ablatio placentae, depends on the complete prevention of further hemorrhage and shock. The gentle simplicity of the Huntington technic meets this requirement in inversion of the uterus after cervical contraction both in theory and in practice, attempts at replacement from below, certainly do not meet it.

Two other remote risks that I would call to your attention are: sepsis from the exposed, often packed uterus, and reinversion. As a guard against the first, should one sometimes do a supracervical hysterectomy after the reinversion? As a guard against the second should a light suspension suture be fixed through the fundus? Experience does not

permit me to answer these questions but they must be borne in mind in any future consideration of the subject.

CONCLUSION

The statements made above I believe permit us to offer the following reclassification of puerperal inversion of the uterus each with its appended appropriate treatment:

Acute Inversion.—Discovered before cervical ring formation. Immediate manual replacement from below.

Subacute Inversion.—Discovered after cervical ring formation. Abdominal replacement Huntington technic.

Chronic Inversion.—Spinelli type cervix spitting operation from below.

Whether one obstetrician prefers to examine for ring formation if an interval has elapsed since inversion occurred probably matters little if done under aseptic conditions, and he stops there if the ring has formed. Personally unless the inversion occurred in a patient I had just delivered myself I would rather assume the cervical ring already present and replace abdominally.

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19 BAY STATE ROAD.

Keiffer: Torsion of the Gravid Uterus. Bruxelles-med. 7: 314, 1926.

A multipara, aged forty-four, had had six years previously a Baldy-Dartegnes operation for retroversion. During the fifth month of the existing pregnancy the patient suffered a severe attack of enteritis, diagnosed as intestinal grippe. From the seventh month on she developed repeated small uterine hemorrhages, with increasing edema of the left leg, thigh, and vulva and of the cervix. The patient went into labor at term, the fetus being in the transverse position. A marked inclination of the uterus to the right was noted. Because after five hours of intensive labor no cervical dilatation had occurred, and in view of the edema, transverse position and probability of a low implantation of the placenta, a cesarean section was decided upon. Upon opening the abdomen the uterus was found densely adherent to the surrounding viscera and rotated on the cervix from left to right so that the uterine incision had to be made on the left side of the fundus parallel to the broad ligament. A living child was delivered, the placenta extracted and the incision closed without trouble. The patient made an afebrile and uninterrupted convalescence.

Keiffer feels certain that it was the operation followed six years later by the intestinal infection with adhesions that produced the uterine torsion.

THEODORE W. ADAMS.

PREMATURE SEPARATION OF THE NORMALLY IMPLANTED PLACENTA

AN ANALYSIS OF 61 CASES

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BY DEGREES, rational conservatism, in its application to the treatment of obstetric complications, is gaining recognition. Such, however, has not been the attitude toward premature separation of the normally implanted placenta. There exists an all-too-prevalent feeling that forcible delivery, operative or otherwise, is strongly indicated, especially in the severe type of this condition. It was with the express purpose of comparing the results of conservative and radical treatment, that a study of this series of cases was undertaken, as well as a review of some outstanding reports in the literature.

Over a period of ten years, from September, 1918, to September, 1928, the records of the colored maternity service of Grady Hospital showed 61 cases of premature separation of the placenta, in a total of 9,208 labors, approximately one in 150 labors. Fifteen cases were of the severe type, as manifested by shock and anemia, 7 were moderately severe, and 39 were of the mild type.

Twenty-nine cases occurred in patients from fifteen to twenty-four years of age; 27 cases in patients from twenty-five to thirty-four years of age, and 5 cases in patients from thirty-five to forty-four years of age. There were 18 primiparae and 43 multiparae. Thirty-six cases occurred during the ninth month, 15 during the eighth, and 10 during the seventh month. The Wassermann reaction was negative in 43 cases and positive in 6 cases, a frequency of 14 per cent, or approximately the same as that of the general service at the present time.

Toxemia, as indicated by albuminuria, hypertension or previous toxic symptoms, was found in 33 cases, or more than half of the entire number. In 2 patients, a short cord; in 1, unruptured membranes; in 1, hydramnios; and in 1, trauma appeared to be the etiologic factor. In 23 cases there was no apparent cause, but in 6 of these patients a condition of shock produced a low blood pressure and there was no record of a urine examination. It is probable that some of these were associated with toxemia. There were 5 cases of twins in the series, this being over five times the normal proportion. There were no cases of eclampsia.

The hemorrhage was external in 56 patients and concealed in 5 patients. Definite tenderness and rigidity of the uterus were found in 38

patients, including all the serious cases; in 2 patients the uterine muscle was apparently soft. In the remaining 21 patients, no note was made of this important finding. Whenever possible, a vaginal examination was made to eliminate the possibility of placenta previa. More or less severe shock was present in 17 patients. The placenta showed the typical appearance of premature separation in 52 patients; in the remaining cases the placenta was not adequately described but clinically the diagnosis was certain. Due to a more or less complete separation, the placenta was expelled spontaneously at once or very soon after the birth of the child in 19 cases.

The treatment is classified as follows: (1) watchful expectancy which includes one or more of such measures as rupture of the membranes, the use of an abdominal binder, pituitrin, ergot, morphine, subcutaneous or intravenous glucose or saline solution to combat shock, and transfusion for anemia; (2) conservative interference which includes the use of the dilating bag or catheter to induce labor, or low forceps or breech extraction to hasten delivery; (3) accouchement forcé which includes manual dilatation of the cervix, internal version and extraction or difficult forcep delivery and, (4) cesarean section with or without hysterectomy or vaginal hysterotomy.

Fifty-two patients, including 6 severe or moderately severe patients, were treated by watchful expectancy with only one death, which occurred on the seventh day, due to antepartum infection manifest on admission and not attributable to the manner of treatment.

Five patients, including 4 of the severe type were treated conservatively, labor being induced with a bag. There were 3 deaths in this group. In 1 patient, death occurred three hours after delivery, apparently from shock and hemorrhage, the latter being of the concealed type during the second stage and continuing after the third stage, although the uterus was packed. In another patient, death occurred one hour after delivery by forceps, during which a third degree laceration was sustained, and immediately following which a severe degree of shock developed. The excessive trauma of the forcep delivery undoubtedly produced a fatal degree of shock, as the hemorrhage was not excessive. Definite evidence of toxemia was present in both of these cases. The third death in this group occurred from shock and hemorrhage five hours after admission. The patient had a fibroid uterus and died undelivered. A suitable donor for transfusion could not be found. The membranes were ruptured artificially and labor induced by the bag method. Autopsy showed the placenta to be almost completely detached, and the hemorrhage concealed.

Three patients, one of whom was of the severe type, were delivered by internal version and extraction and all recovered, although in one patient prompt stimulation for shock was necessary immediately after delivery.

One patient, of the severe type was delivered by cesarean section and the uterus removed. She made a good recovery although the baby was stillborn.

The total maternal mortality was 6.5 per cent. Excluding the death due to antepartum infection, the mortality was 4.9 per cent.

There were 39 stillborn babies. Ten of these were more or less macerated. Twelve babies died after delivery, the majority within a few hours. The total fetal mortality was 83.5 per cent. On account of the extremely high fetal mortality associated with premature separation of the placenta, the choice of treatment need not be influenced to any great extent by a consideration of the child's welfare.

The sudden onset of abdominal pain and hemorrhage in the last trimester of pregnancy usually indicates premature separation of the normally implanted placenta, but the diagnosis and treatment call for thoroughness in the examination, good judgment and care to avoid any procedure which may aggravate or give rise to shock.

The history generally gives indication of preexisting toxemia, manifested by previous headache and swelling. The onset is usually acute with moderate bleeding and more or less severe abdominal pain, not well localized. There is continuous discomfort, increased at intervals, if labor has begun. The patient may complain of faintness or extreme weakness and shortness of breath if shock or hemorrhage is at all marked.

The examination should first be directed to an estimate of the patient's general condition as shown by the general appearance, color, temperature, pulse, respiration, and blood pressure. The latter may be very low if shock is present or the loss of blood excessive. A blood count should be made, the hemoglobin estimated and a specimen of blood taken, to be matched and typed for transfusion should the latter be necessary. On abdominal examination, note should be taken of persistent tenderness and rigidity, which are usually so marked that fetal outlines and fetal heart sounds are difficult to obtain; also, of the occurrence of regular contractions, indicating that labor is in progress. Finally, a vaginal examination is made to eliminate the possibility of placenta previa, being prepared at the same time to obtain a catheterized specimen of urine and to rupture the membranes or insert a dilating bag if indicated. The bleeding is usually observed to be of a darker color than that associated with placenta previa.

Conclusive evidence of premature separation is found in the appearance of the placenta after delivery. It almost invariably shows a much darker bluish appearance and adherent black clots over the area of detachment. The placenta often follows the delivery of the child at once or after a very short interval, due to previous more or less complete separation, and is accompanied by a number of tough, black clots.

There are fundamental differences between placenta previa and pre-

mature separation of the placenta in regard to the general condition of the patient and the nature of the bleeding. These basic differences must be the guide in choosing a rational treatment.

The severe type of premature separation is usually complicated by a toxemia which is apparently of a different nature than that of pre-eclampsie toxemia. The toxic element appears to have a destructive effect on the delicate walls of the smallest blood vessels, which is apparently the direct cause of the hemorrhage at the placental site and, in some cases, of hemorrhages elsewhere. Several patients in this series vomited considerable dark blood during labor. This also accounts for the fact that occasionally there is an extravasation of blood between the muscle fibers of the uterine wall, producing hemorrhagic areas over the surface of the uterus, the so-called "uteroplacental apoplexy" of Couvelaire. The toxemia, together with the hemorrhage which takes place, has a marked tendency to produce shock, or if shock is not actually present, it may develop quickly after any additional trauma. Such a patient is not a good surgical risk for cesarean section and especially Porro cesarean. Any additional trauma, such as manual dilatation of the cervix, a difficult internal version and extraction or a difficult forcep delivery, may precipitate a severe degree of shock which may be fatal. One of the deaths in this series occurred from shock within one hour after a forcep delivery complicated by a third degree laceration. The condition of this patient was apparently satisfactory before the delivery. If the case appears to be of the mild type and labor has begun, no interference is necessary, but the patient should be watched carefully for evidence of anemia or shock, and prompt treatment begun if indicated. Precautionary measures should include blood count, blood typing and matching for possible transfusion and preparation for intravenous or subcutaneous saline or glucose solution. Rupture of the membranes at the time the vaginal examination is made and the use of small doses of pituitrin will be indicated. If regular pains have not begun, it is certainly advisable to induce labor by the use of a bag.

If rapid delivery is contraindicated on account of the danger of shock and the case is of the severe type, what assurance is there that the patient will not die from hemorrhage during a slower process of delivery? Blood transfusion should be one of the most effective agents to combat the loss of blood and lessen the tendency to further hemorrhage. If a donor is not available, intravenous saline or glucose solution will be of considerable value. We may also rely to some extent on the fact that the bleeding from the open sinuses is checked considerably by the pressure of layers of clots underlying the placenta, and also by the fact that the intrauterine pressure is markedly increased by the tetanic condition of the uterine muscle. The presenting part tends to block the outlet and an increase in the intrauterine pres-

sure may be obtained with the abdominal binder, pituitrin or ergot. This is entirely different from the condition present in placenta previa, in which the bleeding from the open sinuses finds a ready exit and cannot be checked by pressure unless by the use of a large bag or by the body of the child after a Braxton-Hicks version.

It has been suggested that cesarean section is particularly indicated in cases of uteroplacental apoplexy, in which there is an extravasation of blood between the uterine muscle fibers, on account of the fact that a uterus so affected may not be capable of sufficient contractile power to control hemorrhage after delivery. There is no clinical sign or symptom which will enable us to diagnose this condition of the uterus without opening the abdomen. Furthermore, we know that in the great majority of cases the uterus does contract satisfactorily after delivery and can usually be safeguarded by massage, pituitrin, ergot, or packing.

A review of other statistics giving comparative results of radical and conservative treatment emphasizes the increased mortality associated with accouchement forcé and cesarean section. Appleton¹ advised against cesarean section on account of the patient being a poor surgical risk. He advocates conservative methods of delivery combined with supportive measures.

Frankl and Heiss² reported 34 cases, 16 of which were of the mild type and all patients recovered. Eighteen patients with severe symptoms were treated as follows: two patients by artificial rupture of the membranes; 4 patients by version and extraction; 4 patients by craniotomy and 7 patients by vaginal hysterotomy. There were nine deaths, a mortality of 50 per cent. The mortality in the series, as a whole, was 26.5 per cent.

Williams³ reported 57 cases, of which 10 patients were treated by cesarean section. There were three deaths, all of which occurred in the group treated by cesarean section.

Fitzgibbons⁴ reported 51 cases from the Rotunda Hospital. There were 8 deaths, a mortality of 15.7 per cent. The mortality was classified according to the treatment used, as follows: palliative, 10.7 per cent; packing, 12.5 per cent; cesarean section, 25 per cent; Porro cesarean, 66 per cent.

Brodhead⁵ reported 34 cases of the severe type. There were 9 deaths, a mortality of 26.4 per cent. The mortality was classified according to the treatment, as follows: 8 cesarean sections with 3 deaths, a mortality of 37.5 per cent; 10 versions with 4 deaths, a mortality of 40 per cent.

Goethals⁶ reported 128 cases with 11 deaths, a mortality of 8.6 per cent. Cesarean section was performed in 39 cases, with 6 deaths, a mortality of 15.3 per cent.

The average maternal mortality of the 65 cesarean section cases in the above reports is 22.6 per cent. Manual dilatation of the cervix; internal version and extraction, which may be difficult on account of the rigidity of the uterine muscle; a hard forceps delivery; craniotomy, which may likewise be very difficult, contribute greatly to shock and increased maternal mortality.

It is therefore best to induce labor in both mild and severe cases of

premature separation of the placenta, if pains are not already established, and allow labor to progress naturally throughout, meanwhile instituting such stimulative or supportive measures as may be indicated according to the patient's general condition. Rupture of the membranes and the use of pituitrin will usually bring about satisfactory progress. Breech extraction or low forcep delivery, if decided upon, should be performed with care to avoid all possible trauma. Manual removal of the placenta should not be resorted to unless the Credè method is unsuccessful and the hemorrhage excessive. This should seldom be necessary inasmuch as there is, rather, a tendency to spontaneous expulsion of the placenta. Intrauterine packing should not be used so long as the uterus manifests a reasonably fair state of contraction. For a period of some hours after the third stage, the patient requires the most watchful care, especially to maintain a well-contracted uterus, and to combat the earliest evidences of shock.

It is believed that the above management of premature separation of the placenta will offer the best prognosis, and furthermore, spare future pregnancies and labors the possible consequences of a weak uterine scar.

CONCLUSIONS

1. Premature separation of the normally implanted placenta is often accompanied by a degree of shock which is out of all proportion to the amount of hemorrhage.

2. Shock is more frequent in the cases accompanied by toxemia and is aggravated or precipitated by any trauma sustained during delivery.

3. The high fetal mortality accompanying premature separation of the placenta practically eliminates the fetus from consideration in the choice of treatment, unless delivery can be hastened without additional trauma and danger to the mother.

4. Induction of labor, watchful expectancy, stimulative and supportive treatment, offer the best prognosis. Shock, if present, should be treated first and labor then induced, if pains have not begun.

5. Cesarean section, manual dilatation of the cervix, internal version and extraction, or difficult forcep delivery are associated with an increased maternal mortality, especially in the severe cases.

6. The period of several hours following delivery is one of great danger for the patient and requires watchful care to combat shock or hemorrhage.

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THE OCCURRENCE OF FUSIFORM BACILLI AND SPIROCHETES ASSOCIATED WITH A FOREIGN BODY IN THE VAGINA

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IN PREVIOUS communications I have shown¹ that in the smegma of normal women, fusiform bacilli and spirochetes were demonstrable in 58 per cent, but in the vaginal tract² these bacteria could not be found.

About the external genitals in certain erosive and ulcerative conditions, these organisms appeared in considerable numbers in the lesions. They often complicate the lesions of syphilis and chaneroids by causing more extensive necrosis. In ulcerating tumors they are often the cause of the necrosis and the putrid odor. In all of these lesions it was noted that these anaerobes were always associated with other bacteria particularly cocci, such as streptococci, and staphylococci, as well as colon bacilli, diphtheroids, and other organisms. Since these organisms were so often found in normal smegma, it appeared that normally they existed as saprophytes, but under certain conditions of the external genitals they could be pathogenic and give rise to ulcerating, necrotic and putrid lesions. In the normal vagina or in vaginal or cervical discharges, at no time could we demonstrate spirochetes and only in two instances were fusiform bacilli found.

In lesions of other organs we have particularly emphasized the importance of predisposing factors in the development of fusospirochetal infections. In the lung³ it was observed that foreign bodies aspirated with mouth secretions lead to pulmonary abscess and gangrene of lung due to fusiform bacilli, spirochetes and associated pyogenic bacteria. Recently, foreign bodies were found in two patients with gangrene of the lung, in one a tooth lodged in the bronchus following a tonsillectomy, in another, a piece of concrete which had fallen into a bronchus of a mechanic while working under a truck. In both instances, large numbers of the anaerobes were demonstrated in the gangrenous abscess cavities.

In the following case, the fusospirochetal infection of the vaginal tract was associated with a foreign body that had been inserted by the patient.

Girl, nine years old, patient of Dr. Bartelt, entered the Lutheran Deaconess Hospital, because of very foul vaginal discharge, consisting of pus and blood, for a period of three months. Since her third year of age, it had been noted that the patient was decidedly subnormal mentally and on previous occasions had inserted foreign bodies into the ears and nose. It was therefore suspected that a foreign body might be present in the vagina as a definite history was obtained of repeated

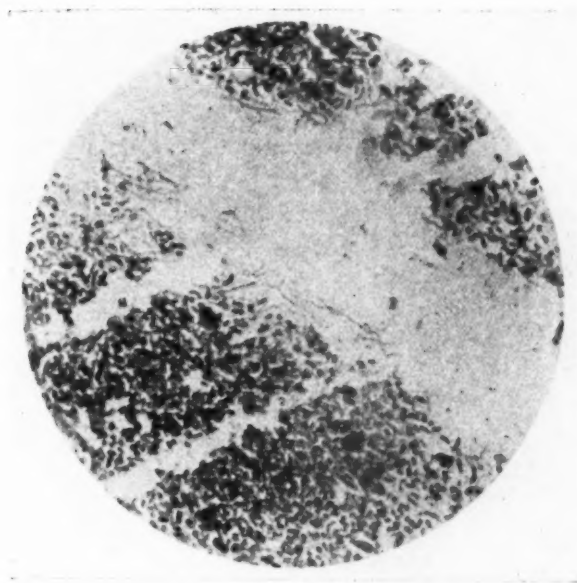


Fig. 1.—Many spirochetes and cocci; few fusiform bacilli.

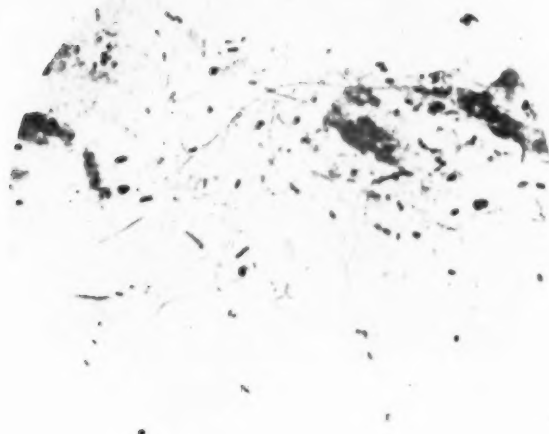


Fig. 2.—Fusiform bacilli together with a few spirochetes and diplococci.

finger insertion. Examination revealed intact hymen and an orifice admitting one finger, through which oozed a blood-tinged, very foul purulent discharge. A hairpin was felt in the interior, the blunt portion pointing backward toward the rectum, the free ends remaining free in the vagina. A smear and culture were made of the pus, carefully avoiding the external genitals. The hairpin was readily removed. Endoscopy was not attempted at this time. The patient did not return to the hospital but was seen at home ten days later. The discharge was markedly less and had no odor or blood. Subsequently, thirty days later, the discharge had completely disappeared.

Smears made of the discharge (Fig. 1), revealed many spirochetes, together with fusiform bacilli and many cocci and other bacilli. In aerobic cultures on blood agar, *Staphylococcus albus* and diphtheroids were identified.

The spirochetes were of varying lengths, some coarser, others finer, with 3 to 8 undulations. (Fig. 1.) From their morphology they could resemble the spirochetes from smegma or from the mouth. The fusiform bacilli (Fig. 2) were large, straight, long forms with pointed ends; a few were shorter and curved. Intermingled with the fusiform bacilli and spirochetes were numerous diplococci, short bacilli, and diphtheroids. (Figs. 1 and 2.)

The lesion was a chronic infection with fusiform bacilli, spirochetes; cocci, and other bacilli acting in symbiosis. While the cocci and other bacteria could very well produce the pus, the putridity of the discharge was due to the fusospirochetes. This has been our experience in other chronic types of infection in the lung, tonsils, middle ear, namely as in this case the fusospirochetes are always associated with pyogenic bacteria especially streptococci and staphylococci.

The occurrence of this fusospirochetal infection in association with a foreign body emphasized the importance of searching for underlying lesions and predisposing factors, either local or general, whenever the ulcerating area or the purulent secretions about the genitals contain the anaerobes in smear preparations.

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Katz, H., and Kaspar, F.: *Carcinoma Of The Rectum and Pregnancy.* *Arch. f. Gynäk.* 128: 250, 1926.

The authors report 18 cases of pregnancy complicated by carcinoma of the rectum and give complete follow-up histories including deliveries and the subsequent operations for the relief of the malignancies. In certain of the cases the carcinoma apparently developed simultaneously with the pregnancy and recurred later with subsequent pregnancies. Especially was this true in women with a definite carcinomatous tendency and family history, and in the presence of rectal polyps. The prognosis of such a complication of pregnancy is fair but could be improved if rectal examinations were carefully and immediately done upon all pregnant women who complained of rectal disturbances of any type.

RALPH A. REIS.

REPORT OF A CASE OF PROLAPSED FIBROID WITH PARTIAL
INVERSION OF THE UTERUS COMPLICATING
THE PUERPERIUM

BY W. F. GEMMILL, M.D., YORK, PA.

(From the York Hospital)

INVERSION of the corpus uteri is of sufficient rarity to classify it as a medical curiosity. Graves states that it occurs once in 128,767 labors; Alice F. Maxwell states that 81.2 per cent resulted from uterine tumors; 2.2 per cent were idiopathic; 1.6 per cent followed abortions or premature labors. She has compiled statistics from 15 foreign clinics showing that the average number of uterine inversions is 1 in 123,364 labors.

The following case is of exceptional interest:

Mrs. H. L., multipara, aged thirty-two years, was admitted to the York Hospital, January 16, 1927, complaining of uterine bleeding. The following history was elicited.

Mild labor pains began Dec. 29, 1926, in the morning and continued until midnight, when the pains disappeared and were resumed again at 7:30 A.M. Delivery took place at 8:30 A.M., December 30, 1926, under light chloroform anesthesia.

The attending physician waited for uterine contraction and used the Credé method of expressing the placenta, but the patient had such a severe hemorrhage that the manual delivery of the placenta was deemed advisable.

On the third day following delivery, the patient passed some material which she thought was afterbirth and about one week later a large mass was seen at the introitus. The patient until this time had not complained of chills or fever.

A consultation was held and, as the patient refused to go to the hospital, the mass was reduced. On the third night, following the reduction of the mass, the patient suffered a severe hemorrhage and the husband gave her ergot; slight bleeding continued and a foul discharge developed. The temperature jumped to 106° F., and the pulse to 150. The patient was put in the Fowler position. Ergot and antistreptococci vaccine were administered.

The mental condition remained clear and the pulse gradually approached normal, the temperature remaining, however, about 100° F.

The vaginal discharge became more and more offensive and there was very little lower abdominal pain but some meteorism.

On admission to the hospital, the pulse was markedly compressible and variable in quality and rate, ranging from 100 to 136 beats per minute. Blood pressure was 100 systolic, 55 diastolic, temperature 100° F. to 103° F. The urine was acid; sp. gr., 1.020; albumin, faint ring; sugar, negative; no red blood cells or casts but many pus cells. Blood examination showed 2,500,000 red blood cells; white cells, 7,400; hemoglobin, 44 per cent; polymorphonuclears 68 per cent; small mononuclears 24 per cent; large mononuclears 5 per cent. The Wassermann test was negative.

The patient presented a very anemic and toxic appearance. The skin was loose, although there was considerable adipose tissue and the abdominal muscles were quite flabby, due to her recent pregnancy. There was a moderate amount of tympanites.

On vaginal examination, a large mass the size of a fist protruded from the cervix. Evidence of gangrene was noticed, particularly on the posterior surface. The palpating finger could be swept around the cervical ring and demonstrated shortening of the left vertical diameter of the uterus.

Rectal examination revealed no cupping of the fundus uteri as one finds in total inversions of that organ; furthermore, the uterine body could be palpated on bimanual examination to be approximately normal in size and position.

Because of these findings, a diagnosis was made of prolapsed fibroid with partial inversion of the uterus, and an operation was advised.

Under ethylene anesthesia, a large boggy fibroid could be felt per vaginam, the size of a small grapefruit. The mass was sloughing and the posterior surface was quite gangrenous. Examination was made for the inverted uterine cornua and internal tubal ostia but without result.

The slight traction necessitated by this examination caused the pedicle of the fibroid to tear so that two clamps were applied, one on either side, and the pedicle above the clamps held with a suture ligature. The mass having separated from the pedicle by its own weight, the ligated stump was pushed above the cervical ring. Palpation of the left posterior region of the corpus revealed a large tear in the uterine wall and the ovary could readily be drawn into the rent. Direct inspection of the uterus through a midline incision revealed a large irregular opening extending from just below the left tubal ostium to the cervix. There was some blood in the culdesac. The left ovary was in close proximity to the torn area and was markedly edematous.

A supravaginal hysterectomy was done, clamp method, leaving in both tubes and ovaries, a drain was inserted extraperitoneally through the cervical stump and three cigarette drains placed in the culdesac protruded through the abdominal incision.

The pulse at the beginning of the operation was 120, at the end of operation 130, the highest point recorded was 150 during the forty minutes the operation was in progress. Digalen (m. xv) was given ten minutes after beginning the operation.

The patient had a stormy recovery and ran a septic temperature for six days. The abdominal wound partially broke down, and cultures revealed the *Staphylococcus aureus*. The patient was discharged in good condition on the thirty-fourth post-operative day.

The pathologic report is as follows:

Grossly the uterus shows the presence of a ragged tear 5 cm. in diameter, the wall is very much macerated, there is also a fibroid tumor 8 cm. in diameter. There is no evidence of malignancy, but the tissues are markedly gangrenous and show a pronounced inflammatory reaction.

135 EAST MARKET STREET.

ENDOMETRIAL CYSTS OF THE OVARY

WITH THE REPORT OF A CASE CURED BY ASPIRATION AND
X-RAY TREATMENT

BY CHARLES MAZER, M.D., AND JACOB HOFFMAN, B.A., M.D.
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THE presence of endometrium-like tissue in the ovary, musculature of the uterus, rectovaginal septum, and in extragenital locations has been a source of more speculation than any other gynecologic condition in recent years. Many theories have been advanced to explain the origin of these heterotopic growths, but so far there is no one theory to explain all forms of endometriosis. There may be more than one etiologic factor concerned in their histogenesis.

Russell,¹ in 1899, was the first to report a case of endometriosis of the ovary. He held that the germinal epithelium is the source of these aberrant growths. Other investigators support this view on the ground that occasionally the cells of the germinal layer dip into the ovarian stroma and, when these ingrowths are cut off from the parent structure, they cannot be distinguished from endometrial glands.

Cullen,² in 1914, ascribed the origin of endometriosis to aberrant müllerian rests. Although these growths in the uterine wall can be traced to such origin, it is far-fetched to suppose that they are responsible for endometriomas that occur in extra-uterine parts of the pelvis.

Embryologic investigation shows that all genital epithelia are derived from the celomic epithelium of the urogenital fold. From it are derived the lining of the müllerian ducts, the germinal epithelium of the ovary, the follicular epithelium, and the pelvic peritoneum. The endometrium and endosalpinx must therefore be considered mere modifications of the pelvic peritoneum. Based on these facts, Lockyer,³ in 1918, expounded the serosal theory. He believes that metaplasia of the peritoneal mesothelium is the etiologic factor in these aberrant growths, and that, being derived from the same mother layer, the pelvic peritoneum and germinal epithelium may, under perverted hormonal stimulation, show regional differentiation into endometrium or endosalpinx.

The serosal theory seems to be the most rational and can account for all forms of endometriosis, whether it be in the pelvic peritoneum, ovary, umbilicus, inguinal canal, rectovaginal septum, appendix, or abdominal scars following operations where the uterine cavity had not been incised.

Robert Meyer⁴ is of the opinion that these growths are of inflammatory origin, pointing out that the serosa under such conditions is capable of forming gland-like structures because of its embryonal derivation. This theory is supported by M. T. Goldstein⁵ and other observers.

Sampson,⁶ in 1921, reported his first twenty-three cases of endometrium-like tissue in hemorrhagic ovarian cysts. He evolved the theory that these endometrial cysts owe their origin to implantation and subsequent growth of uterine epithelium which escaped together with menstrual blood from the fimbriated ends of the fallopian tubes. With the extensive employment of the Rubin test, the transplantation theory of Sampson received a serious set-back. One would expect an enormous

increase in the incidence of endometriosis in women subjected to transuterine insufflation. Though a few isolated cases of pelvic endometriosis following the Rubin test were reported, we have personally never observed a single case in nearly 1500 women whom we subjected to the Rubin test during the past seven years.

More recently Halban,⁷ of Vienna, explained the existence of endometriosis on the basis of lymphatic distribution.

A discussion of the relative merits of the various theories concerning the origin of endometriosis is not within the scope of this paper. Passing mention of these theories was necessary in order to understand the rationale of the treatment instituted in the case herein reported.

Regardless of whether these growths are the result of lymphatic metastasis, peritoneal metaplasia, or seed implantation, there is no doubt of their endometrial nature. Their histologic structure, decidual reaction during pregnancy, and the characteristic cyclic changes they undergo during menstruation, make this view incontestable. The endocrine relationship that exists between the ovaries and the normal endometrium is evident in these growths. The continued activity on the part of ectopic endometrium in the presence of functioning ovaries, and the regressive changes it undergoes, when the ovaries are completely ablated, are matters of common knowledge. Thus Graves⁸ reported four cases of obstructing rectovaginal adenomyomas cured by ablation of the ovaries. The diagnosis was established on microscopic evidence. Other investigators observed similar regressive changes in endometriomas involving areas of the rectum and bladder which could not be resected during the course of a panhysterectomy. These facts indicate that the activity of misplaced endometrial tissue ceases when deprived of the activating influence of ovarian hormone. Although ablation of the ovaries and irradiation were successfully used in the treatment of solid endometrial tumors, a perusal of the literature does not disclose a single case in which aspiration of the contents of endometrial cysts with subsequent irradiation was ever employed in the treatment of this condition. The following case is of sufficient interest to warrant recording.

S. S., aged forty-five, a mother of four children, was admitted to the Mount Sinai Hospital on August 31, 1927, complaining of pain and distention of the abdomen, more marked with the advent of the menstrual flow. Her family and past history are irrelevant. The patient weighed 214 pounds. She had many decayed and abscessed teeth, hypertrophied and infected tonsils, and chronic pansinusitis. The pulse was 120, blood pressure comparatively low, cardiac muscle tone poor. A large intraperitoneal cystic mass reaching three fingers above the umbilicus, and some edema of the abdominal wall and lower extremities were noted. Vaginal examination showed the uterus only slightly enlarged and pushed to the left by the mass described above. There was a moderate secondary anemia. Blood chemistry and Wassermann test were negative.

After preoperative rest in bed and the administration of digitalis, the patient was prepared for operation under spinal anesthesia. Because of a few unsuccessful attempts to introduce the anesthetic, her pulse became too rapid and feeble to warrant an attempt at operation under a general anesthetic. In order to relieve

the embarrassed myocardium, aspiration of the cyst as a temporary measure was deemed advisable. This yielded five quarts of tarry chocolate-colored fluid. It dawned on us that we were probably dealing with an endometrial cyst. We therefore resorted to intensive x-ray treatment in the hope of causing regressive changes in the cyst wall by withdrawing the hormonal influence of the remaining ovary and through the direct action of the rays on the cyst wall.

The patient made an uneventful recovery and on discharge from the hospital, four weeks later, only a small, not tender mass was palpable to the right of the uterus. This mass gradually disappeared under the influence of repeated x-ray treatment so that there is, at present, no evidence of adnexal pathology.

We realize that the mere recovery of thick chocolate-colored material from an ovarian cyst does not justify the diagnosis of endometriosis and that it is rather hazardous to subject an enormous sac of a simple hemorrhagic cyst to intensive irradiation. Microscopic examination of the aspirated fluid rarely gives a clue as to the structure of the cyst wall. The shrinkage and final disappearance of the sac when the hormonal influence of the remaining ovary was withdrawn under the influence of irradiation is positive proof of its endometrial nature. The general condition of this patient was such that no measure at our disposal could equal the risk of an abdominal operation.

Our past experience with huge hemorrhagic cysts of the ovary led us to believe that the cyst wall, in this case, was most probably of endometrial origin. On two previous occasions we encountered chocolate-colored fluid when needling the abdomen to differentiate between general peritonitis and encysted fluid. In one case the endometrial cyst was twisted on its pedicle, giving rise to board-like rigidity of the abdominal wall usually seen in general peritonitis. The appearance of the aspirated fluid justified immediate operative interference. In the other case, the cyst contents had undergone infection which gave rise to symptoms of diffuse peritonitis. Subsequent examination of the cyst wall in both cases corroborated the diagnosis of endometriosis. The history of cyclic abdominal pain coincident with menstruation was another factor in leading us to suspect the endometrial nature of the ovarian cysts recorded.

This method of treating large endometrial cysts of the ovary is applicable in women near the menopause and in those upon whom an abdominal operation is too hazardous to undertake because of some serious constitutional condition.

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1829 PINE STREET.

SIMPLE ROUND ULCERS OF THE VAGINA

By C. F. FLUHMANN, M.D., C.M., SAN FRANCISCO, CALIF.

(From the Department of Obstetrics and Gynecology, Stanford University School of Medicine)

THE term "ulcus rotundum simplex vaginae" was first used by Zahn in 1884 to describe an ulcerative lesion of the vaginal wall which he noted as an accidental finding during an autopsy. The condition has since been observed a few times on living patients, but it is unusual in occurrence and seems to have attracted but little attention. A search of the literature fails to reveal any case reported in this country, and the only detailed account that has been published since 1904 is that of Schroeder and Kuhlmann, which appeared in 1922. The object of the present study is to give a review of the subject and to report two additional cases.

HISTORICAL

Five of the 16 cases of simple round ulcer of the vagina which have been reported were observations made as accidental findings at autopsy. The first instance was described by Zahn¹ in 1884. The patient was a woman of seventy-six years, who died following a right-sided contracture of the extremities and aphasia. She had been in the hospital six years and no indication of a pelvic abnormality had ever been found. At autopsy an ulceration was discovered in the upper part of the vagina on the posterior wall and somewhat to the left of the midline. It was superficial, almost circular in shape, measured 2.5 by 2.3 cm., was sharply demarcated, and the base was hyperemic and covered with a thin layer of purulent material. There was no induration about the ulcer. Microscopically, nothing remarkable was seen besides connective tissue markedly infiltrated with round cells. The uterine and vaginal arteries were sclerotic and the size of the lumina was much diminished, while an arterial branch leading to the region of the ulcer was completely obliterated.

Browicz² in 1888 described the findings in the vagina of a woman of fifty-nine years who had died of croupous pneumonia. In the right posterior part of the portio vaginalis he found a smooth circular area, sharply limited, of a grayish to a brownish black color, which represented a superficial ulceration. There were, in all, eight similar small spots in various parts of the vagina. Microscopic examination showed necrotic tissue, and a study of the blood vessels in the neighborhood showed an obliteration of their lumina.

Zahn³ published a description of a second case in 1889. The patient, aged fifty-one, had died of endocarditis and chronic pulmonary tuberculosis. The findings in the vagina were "chronic atrophic vaginitis with ecchymosis and hemorrhagic erosions; *ulcus rotundum simplex incipiens*." This ulcer, again, was found posteriorly to the left of the midline and just below the external os, and measured 2.0 by 1.0 cm. It is described as a brownish area, somewhat depressed from the surrounding mucosa and with sharp edges. The author considered this finding as an incipient ulcer and mentions other similar fine spots, brownish in color and with a central depression, on the right and anterior walls of the vagina. There were, in addition, marked endarteritic changes in the uterine and vaginal arteries.

The first published observation of this type of ulceration in the living woman seems to have been made by Braithwaite⁴ in 1894, although he was unaware of the preceding work of Zahn and Browicz. In a paper entitled "Destructive Ulceration of the Vagina," he described two types of vaginal ulcers which he had seen, and subsequent writers (Beuttner, Veit, Schroeder and Kuhlmann) have accepted one of these as belonging to the category of simple round ulcer. He mentions two cases. The first was a woman fifty-five years old, who had been living under bad hygienic conditions, and had some time before had an enucleation of an eye for a low grade infection. On pelvic examination he noted four or five narrow ulcers on the posterior wall of the vagina, which coalesced and gradually spread until the whole lower half of the vagina was involved. There was no slough over the ulceration, the edges were sharp, and there was no induration. The patient recovered following topical applications, general hygienic care, and a restful vacation in the country. The author then states that he saw a second case, but he does not give any details beyond the statement that there was an ulceration of the posterior vaginal wall of the same nature as described above, although not quite so extensive. The patient soon left the hospital unimproved and was lost sight of.

In 1895, von Skowronski⁵ described the third case observed on a living woman. The patient, aged thirty-seven, complained of pain in the region of the urethra, and frequency and burning on micturition. Pelvic examination showed a shallow, round ulcer the size of a "half-kreuzer" on the anterior vaginal wall 1.5 cm. from the urethra, which was sharply defined, and covered with irregular necrotic granulations. The ulcer was excised, and the microscopic examination revealed a sharp breaking off of the mucosa at the edge of the ulcer; the base was made up of necrotic tissue; the submucosa was still recognizable here and there; the blood vessels showed a typical picture of obliteration of the lumina.

In 1896, two additional cases found at autopsy were reported from Zahn's laboratory by Beuttner.⁶ The first instance was a woman of forty-four years, who had died from cardiac disease. An ulcer measuring 1.5 by 1.2 cm. was found on the posterior vaginal wall somewhat to the left of the mid-line and 3 cm. below the cervix uteri. The edges of the ulcer were sharply defined and were undermined only at one extremity. There were numerous ecchymotic erosions of the vaginal wall. The second case was a woman of fifty-eight years who also had died of heart disease, and at autopsy, among other anomalies, was found an ulcer of the duodenum, ecchymotic erosions of the large intestine, a small uterine fibroid, and a mucous polyp of the cervix uteri. In about the same situation in the vagina as in the previous case he found a triangular scar, slightly elevated from the surrounding mucosa, and measuring 7 by 5 by 6 mm. From this region a narrow band of scar tissue 6 mm. broad led upward to the external os.

Bekmann⁷ reported a case in 1897 occurring in a woman sixty-four years of age, who complained of leucorrhea. The ulcer was slightly larger than a "6 sous," round but not quite regular, very shallow, sharp edges, with reddish base covered with yellowish detritus, and was situated in the posterior culdesac slightly to the right of the midline. The ulcer was excised, but the wound broke down and healing only took place by secondary intention. The histologic study showed a sharp breaking off of the mucosa, the surface of the ulcer looked like granulation tissue with extravasation of blood and areas of necrosis, and a marked infiltration with small round cells. An endarteritis was present in the blood vessels, but no definite obliteration of the lumina could be demonstrated. In one area there were dilated capillaries.

Two cases were described by Thomson⁸ in 1904. The first was a young woman aged twenty-two, with pain in the lower abdomen and dyspareunia. The ulcer was 1 cm. in diameter, and was found on the posterior vaginal vault somewhat to the left. It was sharply defined, the base was reddened, and no induration was de-

monstrable. The patient had a marked accompanying anemia. The ulcer was treated with the thermocautery, but it did not show much tendency to heal after this and the author then lost trace of the patient. A small piece had been removed from the wall of the ulcer, which microscopically showed a vascular connective tissue with slight round cell infiltration. In some places the epithelium was thickened. The second patient was a woman aged thirty-one who complained of profuse menstrual periods and pain in the lower abdomen. She was not well nourished, and was somewhat anemic. On the posterior vaginal wall was a shallow ulcer with sharp edges, which in size admitted the finger tip. The lesion healed spontaneously.

In their paper, Schroeder and Kuhlmann refer to a case reported by Puech⁹ in 1905. Although this reference is given in one or two journals of the time, it cannot be found in the *Index Medicus*, and the journal in which it appeared seems to have been unknown in this country. No description of this case, therefore, is available for this review.

In the edition of his textbook published in 1908, Veit¹⁰ refers to this condition and mentions having seen two cases in living women. He does not give any details except that the histologic examination in one patient showed an associated senile vaginitis.

Schroeder and Kuhlmann¹¹ gave a very complete account of one case in 1922. The patient was forty-one years old and applied for treatment because of a "bearing down sensation" and leucorrhea. The ulcer was found just behind the frenulum labiorum posterius. It was almost circular, 2 mm. in depth and 1 cm. in diameter. The edges were sharply defined, not undermined, and the base had a "yellowish, glassy, fatty" appearance. The surrounding mucosa was essentially normal. There was very slight induration around the ulcer. The treatment consisted of excision. The histologic picture showed the base to be covered with fibrin, and under this surface was a granulation tissue infiltrated with polymorphonuclear leucocytes. The vessels were thin-walled, without hyaline changes or perivascular thickening, and were surrounded by round cells and polymorphonuclear leucocytes. There were inflammatory cells deep in the musculature. The epithelium extended to the edge of the ulcer without any undue thickening, and shortly before it reached the ulcer itself, it gradually thinned out. Plasma cells were demonstrable. Deep tissue necroses, epithelioid cells, giant-cell formation, hyaline degeneration of the vessels, could not be found at any point. No tubercle bacilli, *Spirocheta pallida* or Ducrey's bacilli were demonstrable by specific stains.

In his textbook on *Special Pathology*, Kaufmann¹² refers to the paper by Schroeder and Kuhlmann and states that reddish demarcated areas of necrosis may be found at an early stage of this disease and that he saw several in the vagina of one woman eighty-seven years of age.

CASE REPORTS

The following case has recently come under the observation of the Stanford Gynecologic Service at the San Francisco Hospital:

CASE 1.—Mrs. L. B., aged forty-nine, gravida iii, para iii; menopause two years ago. Admitted March 5, 1929, complaining of profuse vaginal bleeding of two days' duration.

General physical examination showed no abnormalities relative to present complaint, except a marked secondary anemia. Blood count gave R.B.C. 1,420,000, W.B.C. 7,400, and hemoglobin 50 per cent. No abnormal cells seen in differential count. Wassermann reaction negative.

On pelvic examination there were no pathologic findings associated with the uterus and appendages. Speculum examination showed a superficial ulceration,

oval in shape, 3 cm. long by 1.5 cm. wide, situated on the left vaginal wall about midway between the vault of the vagina and the outlet. The edges were sharply demarcated, there was no undermining, and the base was covered with a fibrinous exudate. The surrounding mucosa was pale, and there were a number of punctate hemorrhagic spots in the vault of the vagina.

The patient was bleeding profusely from the ulcer, a tight vaginal pack was used to control the hemorrhage, and she was given a blood transfusion.

On March 19, a portion of the ulcer was excised for microscopic examination. The patient's general condition gradually improved, and on March 27 the blood count showed 2,200,000 red blood cells, although the hemoglobin was only 35 per cent. Since her admission she had also run a febrile course, the afternoon temperature varying between 99° and 100.5° F.

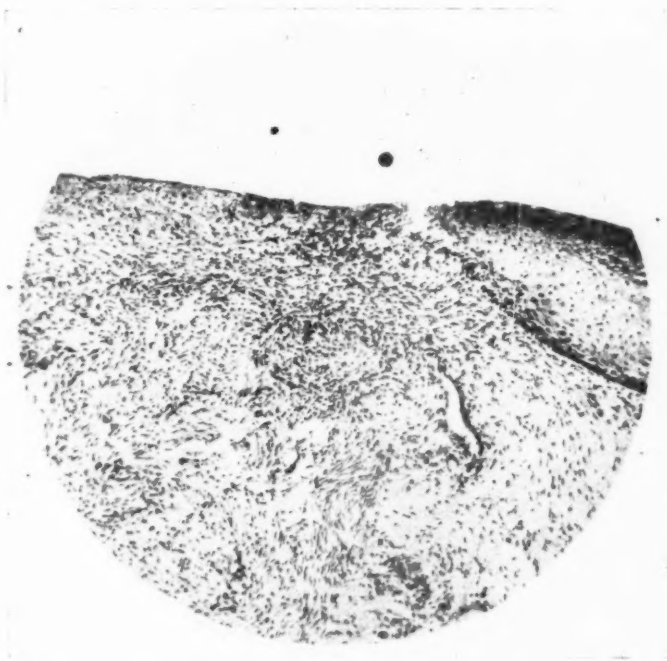


Fig. 1.—Simple round ulcer of the vagina. First case. $\times 100$.

Following a pelvic examination on April 1, profuse bleeding again set in and could only be controlled by a series of vaginal packs. The patient was given another blood transfusion, and topical applications of a weak solution of silver nitrate were used in the vagina. Her condition now rapidly improved, and examination on April 19 showed the ulcer to be healing rapidly, although other hemorrhagic erosions of the vaginal wall were seen. On April 29 healing had progressed to such a point that it was felt she could be discharged from the hospital. On May 9 the ulcer was completely healed, and subsequent examinations failed to show any tendency to recur.

The histologic examination of the biopsy specimen from the ulcer showed chronic inflammatory changes (Fig. 1). The vaginal mucosa was essentially normal, except for a subepithelial infiltration with round cells in the neighborhood of the ulcer, and the epithelium gradually thinned out as it approached the edge of the lesion. The base was composed of a thin layer of connective tissue resting on muscle and

fat. There was a slight infiltration of the whole area with polymorphonuclear leucocytes, lymphocytes, and sections stained with methyl-green pylonin showed the presence of a considerable number of mast-cells. In one area near the surface there were numerous small blood vessels, and deep-seated arteries showed endarteritis. There were no deep necroses, tubercle formations, tubercle bacilli, etc., demonstrable by special stains.

A search through the records of the Stanford University Gynecologic Service shows that a similar case was seen in the Lane Hospital in 1916. The history is complete, and the sections are still available for examination.



Fig. 2.—Simple round ulcer of the vagina. Second case. $\times 100$.

CASE 2.—Mrs. K. L., aged sixty-three, gravida ii, para ii, menopause twenty-three years ago. Patient had been under the care of the Neuropsychiatry Department for numerous complaints, and was referred to the Gynecologic Department because of burning and frequency of micturition. Cystoscopic examination pointed to a possible left-sided pyelitis, and the culture of the urine gave *B. coli communis*. Wassermann reaction was negative. Blood count normal.

Pelvic examination showed no abnormalities of the external genitalia; the uterus was small and atrophic, and nothing unusual was noted in the appendages. The vagina was small and seemed normal to palpitation, but on speculum examination a superficial ulcer was seen in the left fornix. It was slightly irregular in shape, measured 1.0 by 0.8 cm., the edges were sharply demarcated but not undermined, there was no surrounding induration, and the base was clean, granular, and of a pinkish color. Another similar ulcer of approximately the same size was seen in the right fornix. The surrounding vaginal mucosa appeared normal for a patient of her age.

A biopsy specimen was obtained from the ulcer on the right side, and the lesions were then treated by topical applications of a solution of silver nitrate. They healed rapidly and were no longer visible a few weeks after they had first been noted.

The histopathologic examination showed an atrophy of the vaginal mucosa, which thinned out gradually as it approached the edge of the ulcer (Fig. 2). The base was composed of connective tissue, and there was a much more extensive infiltration with polymorphonuclear leucocytes and lymphocytes than in the previous instance. There were also numerous eosinophiles and a number of plasma cells. The blood vessels showed no remarkable features, but an increase in their number was noted in the region of the ulcer. As in the first case, there were no extensive necroses, no tubercle formations, and special stains for tubercle bacilli were negative.

SUMMARY AND DISCUSSION

The *ulcus rotundum simplex vaginae* is to be regarded as a rare lesion. It has been observed only once in 4666 hospital admissions on the gynecologic service of Lane Hospital. The age incidence is known in 14 of the 18 reported cases, and all but 3 of the patients were over forty years of age, while 4 of these were over sixty. There is apparently no connection between this lesion and other pelvic disease, the only exception being Beuttner's second case, where a small uterine fibroid and a cervical polyp were found. In several instances, however, general systemic conditions were described. Zahn's first case died with a contracture of the extremities and aphasia, for which she had been in hospital six years; both Beuttner's patients had cardiac disease, and autopsy in one case showed in addition an ulcer of the duodenum and ecchymotic erosions of the large intestine; Browiez' case had a croupous pneumonia; Zahn's second, an endocarditis and chronic pulmonary tuberculosis; one of Braithwaite's, a general asthenia; and Thomson's first case and one of mine, a marked secondary anemia.

The ulcer is a chronic lesion, and in most cases there were few or no associated symptoms. It may produce a leucorrhea, there may be some bleeding, and although it is generally painless this is dependent on the site of the ulcer, but any manipulation may elicit tenderness. It is characteristically round or oval in shape; its edges are even, sharply demarcated, and there is no undermining; it is very shallow in depth; there is no surrounding induration, and on palpation it may be missed altogether. The base is usually smooth, reddened, and has the appearance of granulation tissue, or it may be covered by a fibrinous or purulent exudate. The surrounding vaginal mucosa appears normal, although in Zahn's second patient there was an extensive ecchymosis and hemorrhagic erosion, in one of Veit's there was a senile vaginitis, and in my first case there were fine punctate hemorrhagic spots in the vault of the vagina. Of thirteen instances in which the site of the ulcer is known, it occurred eleven times on the posterior vaginal wall, and once on each of the anterior and lateral walls. It was just to the left of the midline on the posterior wall in 6 cases, and Beuttner ex-

plains this feature as being the site where the secretions from the cervical canal are poured out. The lesion is invariably single, although in one of my cases there were two ulcers, in Browicz' there were eight, in Braithwaite's there were four or five which gradually coalesced, and Kaufmann noted a large number of areas of necrosis in his patient.

A detailed histopathologic study of this lesion has apparently only been made in 9 cases, and showed no special features which would establish its identity from any superficial chronic inflammatory ulcer. The surrounding mucosa presents no marked changes, and either breaks off suddenly at the edge of the ulcer or thins out gradually. The base is composed of granulation tissue, it may be covered with fibrin or purulent material, and there is a moderate infiltration with polymorphonuclear leucocytes, lymphocytes, and sometimes plasma cells and mast-cells. The ulcer is shallow and there is no extensive necrosis of the underlying muscle and fatty tissues. In 5 cases a thickening of the walls of the surrounding vessels with obliteration of the lumen was described.

A number of theories have been advanced to account for the etiology of the simple round ulcer of the vagina. Zahn and most of the earlier authors were much impressed with the endarteritic changes in the blood vessels accompanying these lesions and were convinced that they were the most important factor. It must be remembered in this connection, however, that most of these patients were at an age when such vascular changes are frequent, and on the other hand the occurrence of these ulcers is very unusual. A bacterial origin, and the possibility of trauma during coitus or following the introduction of a foreign body, have also been suggested. Schroeder and Kuhlmann advance the theoretical consideration of a pathologic change in the vaginal secretion as a possible factor. As these authors assert, however, it must be remembered that the *ulcus rotundum simplex vaginae* is not a specific type of lesion but simply a chronic inflammatory ulcer which has assumed a particular form in the vagina.

The differential diagnosis is of importance and is given in detail in Schroeder and Kuhlmann's monograph. They distinguish nine types of ulcers besides the one described in this paper. (1) The *phagedenic* ulcer, a variety allied to the simple round ulcer and first mentioned by Clarke¹² in 1821 as a "corroding ulcer of the os uteri." It is recognized by its irregular form, its thickened hard edges, extensive tissue destruction of the cervix and vagina, and profuse accompanying hemorrhages. A similar type has also been described as the *aphthous* ulcer. (2) *Tuberculous* ulcer. (3) *Syphilitic* ulcer. (4) *Chancroid* ulcer. (5) *Dysenteric* ulcer. (6) *Diphtheritic* ulcer. (7) *Uremic* ulcer. (8) *Chemical* ulcer. (9) *Varicose* ulcer. To these may be added (10) *traumatic* ulcer, to include those forms seen following the injudicious use of pessaries, postoperative ulcerations, etc.

Owing to the few observations of this disease there is no general agreement as to the most satisfactory method of treatment. Total excision was done in 3 cases with healing by primary intention on one occasion. Treatment with the cautery was attempted once, but with no success. Four cases are known to have done well by simple local applications and general hygienic care of the patients. In both instances reported in this paper the lesions healed readily with topical applications of a weak solution of silver nitrate, but one patient remained in bed in hospital for several weeks. It would seem that a conservative method of treatment with excision as a last recourse would be the most logical procedure.

CONCLUSIONS

A review of the literature shows that 16 cases of *ulcus rotundum simplex vaginae* have previously been mentioned. Two additional instances are reported.

The lesion is a chronic nonspecific inflammatory ulcer of the vagina, which usually occurs after the age of forty. The etiology is not understood.

The differential diagnosis consists in recognizing it from ten other ulcerative conditions which may occur in this situation.

Treatment by conservative means is recommended.

My thanks are due to Mr. Pierre Lassègues for the technical work connected with this study.

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STANFORD UNIVERSITY HOSPITAL.

THE INCIDENCE OF UNDULANT FEVER IN PREGNANCY AND ABORTION

By E. L. CORNELL, M.D., AND C. R. DEYOUNG, B.S., CHICAGO, ILL.

(From the Cook County Hospital, Chicago Lying-In Hospital, and Research Laboratories, Department of Health)

THE senior author became interested in the subject of undulant fever, first, because of an attack of the disease, and second, through the writings of Hardy. It was thought possible that undulant fever might be overlooked in pregnant patients, especially in those who abort. The Research Division of the Chicago Department of Health was consulted and a plan outlined to determine if the blood of pregnant women in this locality would react to *Brucella abortus* or *Brucella melitensis* antigens.

The blood specimens taken for the Wassermann test from patients applying to the prenatal clinics of the Chicago Lying-In Hospital and Dispensary and the Cook County Hospital were used. All patients in the series who aborted during this time were also included. Most of them were women who had had a criminal abortion performed. The patients were from the middle and lower classes of the Chicago district, including whites, colored people, and Mexicans. They lived in all sections of the city and, therefore, present a rough cross-section of the population.

In 1928, 6 cases of proved undulant fever were reported in Chicago. None of these had been in direct contact with farm animals, so far as could be learned, and all were city dwellers. Since the market milk supply of Chicago consists only of pasteurized milk (99 per cent) and certified milk (1 per cent), the possibility of milk-borne infection seems unlikely and the question of how the infection was contracted remains open.

The literature on the subject of the source of human infection is somewhat at variance. On the one hand, definite contact of human cases of undulant fever with infected cattle and with the raw milk of infected cattle, has given rise to the belief that human infections are often of bovine origin. On the other hand, it is pointed out that other groups of persons in constant contact with the bovine disease and drinking the raw milk of such animals for many years have not developed the disease. Laboratory data, though as yet meager, seem to indicate that the organism commonly found in human undulant fever corresponds more closely to the porcine type of *Brucella* than to the bovine. Further data based on detailed type studies of the *Brucella* encountered are needed to solve this problem.

Clinically the senior author knows of 28 cases of undulant fever among college students which were thought to be contracted by drinking raw milk from a herd found to be badly infected with *Brucella abortus*. It is not known whether the organism conformed culturally to the bovine or porcine type. Epidemiologic evidence, however, pointed to infected raw milk as the apparent agent of transmission in these 28 cases.

In Chicago the etiology of the disease is not clear, since all market milk except certified is pasteurized and it is generally conceded that pasteurization is an effective protection. The senior author suggests the following sources of infection as possible factors in the dissemination of the disease.

(A) *Liver and Meat*.—Liver is eaten by a great many people because of the present fad. The supply of calves' liver does not equal the demand, so beef liver and pigs' liver are being offered by the meat packers. Such products are not always thoroughly cooked, especially when put up in the form of sausage and similar edibles consumed without further heating. We know that pigs and cows suffer from the disease and that the infecting organism is present in the blood. Hence it is conceivable that the disease may gain access to the human body through uncooked or partially cooked meat and liver from infected cows and pigs.

(B) *Certified Milk*.—In spite of all the precautions taken by certified milk producers, this product cannot at present be eliminated as a possible source of contagion. Conclusive data, sufficient to establish its rôle, are not as yet available.

In 1917 De Forest¹ wrote on "Infectious Abortion in Cattle, as a Complication of Pregnancy in Women." In the cases reported by him the connection between *Brucella abortus* in cattle and the abortions in women is based on clinical and epidemiologic evidence only. Theoretically it seems possible that some abortions in women may be due to undulant fever.

Perhaps those patients who do not make a good recovery following an abortion may owe their long illness to this cause. The increasing number of undulant fever cases in this country should soon afford means of solving the question.

We are making a study of all abortion cases both spontaneous and criminal coming under our observation. Cultures are being made from the aborted material and agglutination tests are being run.

Experimental Work.—One thousand and fifteen blood specimens from pregnant women were tested by the macroscopic agglutination method with polyvalent *Brucella abortus* and *Brucella melitensis* antigens. The serum was separated, inactivated and submitted to the Health Department laboratories for test. The macroscopic agglutination test used was essentially that described by A. V. Hardy² of Iowa

City, Iowa, with the modification that the suspensions were formalinized for preservation and safety in handling. This was done by adding one-half of one per cent of neutral formalin solution as suggested by I. F. Huddleson.³

Previous to adoption of the formalinized antigen for routine purposes, nine known positive and a number of known negative sera were run in duplicate in cooperation with Mr. Hardy, using formalinized antigens prepared by us and nonformalinized antigens prepared by him. The formalinized antigens were eight months old and the nonformalinized antigens two weeks old at the time of the check test. All agglutination results, both positive and negative, were identical in this series for each type of antigen.

The cultures used for the antigens were as follows:

Brucella abortus 705, isolated in England and designated by Huddleson as *Brucella abortus* 172.

Brucella abortus 456, isolated from a cow's fetus and supplied by the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.⁴

Brucella melitensis 803, isolated from a guinea pig, inoculated with goat's milk and supplied by the Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Brucella melitensis 428, supplied by the Pasteur Institute of Algeria; source of isolation apparently unknown.⁴

To prepare the antigens, cultures were planted in beef liver infusion agar (Stafseth and Huddleson⁵) in large test tubes, by seeding with a loopful of organisms from a stock culture. The tubes were incubated for forty-eight hours at 37° C. The growth was suspended in sterile distilled water containing 0.5 per cent of neutral formalin. Approximately 15 c.c. of the formalin solution were added by means of a sterile pipette to each tube of culture, and after this treatment smears were made to check the purity of the organism. Extreme precautions should be taken in these procedures to avoid exposure to infection and contamination of the material. Each tube was mixed by rolling in the palms of the hands and the suspensions transferred to large sterile flasks. The flasks were shaken from time to time for two days and then placed in the ice box for five days. Tests for sterility were made on the seventh day, and if found sterile the antigen was filtered and standardized by matching to turbidity No. 4 of Kober's nephelometer.

The agglutination tests of the series were carried out in $\frac{1}{4}$ by 6 inch tubes. Known dilutions of inactivated sera of 1 to 5, 1 to 20, and 1 to 50 were prepared in saline solution and one-half c.c. amounts placed in the test tubes. One-half of one c.c. of standardized antigen was then added to each tube. The tubes were shaken vigorously for about thirty seconds, placed in a water-bath at 37° C. for four hours and then put on ice overnight. Readings were made on the following morning and recorded as described by Evans.⁶

Results: Of the 1,015 blood sera from pregnant women subjected to agglutination test with the antigens of *Brucella abortus* and *Brucella melitensis*, none gave definitely positive results and only five gave slightly positive reactions. The reactions of these five are given in Table I.

Clinically, there was no premature interruption of pregnancy in any of these 5 patients, and they were apparently enjoying the best of health. They had never had any illness that suggested undulant fever. Two have since been delivered at full term, both having normal children. The detailed history of these patients is not given because none shows anything of interest bearing on the subject.

TABLE I

LABORATORY NUMBER	1/10	DILUTION 1/40	1/100
28	++++	++++	0
132	++++	0	0
468	++++	0	0
724	++++	0	0
847	++++	+++	0

Twenty-three cases of abortion in women were studied. Of these, the sera of 22 patients were negative to the agglutination test. One gave a weakly positive reaction with placental blood. In 6 cases in which the placental material was submitted, cultures were also made. The cultural methods used were those described by Evans⁶ except that a duplicate was run in a tube sealed with paraffin to retain carbon dioxide, to permit growth of the bovine type of *Brucella*. None of the cultures yielded *Brucella abortus* or *Brucella melitensis*.

The one patient whose placental blood agglutinated the antigens in low dilutions, gave a history as follows:

Mrs. K., aged thirty-five, married two years; had measles, whooping cough, followed by mumps, otitis media, ten years ago; influenza in 1918. No typhoid. Surgically negative. Patient went to Europe June 1, 1928, for five months. While in Paris she noticed the onset of malaise and that she perspired very easily. She had no temperature or chills at this time. These symptoms continued until her arrival in the United States November 1, 1928. Since that time the patient noticed that she became tired very easily and was drowsy a good deal of the time. October 18, during voyage, patient had her menstrual flow for one day. Three days later she had severe cramps and passed many clots. This continued for twelve days. Her last period occurred November 20, 1928. She aborted January 27, 1929, after suffering from bleeding and cramps for one week. Curettage yielded only a small amount of tissue, which was sent to the laboratory for examination. The culture for *Brucella abortus* was negative. The agglutination test with vaginal blood gave a positive reaction in a dilution of 1-80. A venous blood test taken one week later was reported negative by two laboratories.

In the Chicago Health Department laboratories, agglutination tests for undulant fever have been run routinely for some time past on all blood specimens submitted for the Widal test. Six hundred and fourteen such tests have accumulated (418 microscopic and 196 macroscopic tests). Of these, 608 were negative and 6 positive.

All the 6 cases represented persons in which a clinical diagnosis of undulant fever was made or suspected by the patients' physicians. Sera

from these 6 patients agglutinated the formalinized antigens in dilutions of from 1 in 300 to 1 in 2,000. The histories of three of the cases indicated infection originating out of the city. In two others we were unable to establish definite animal contact other than the indirect contact of using foreign cheese or certified milk as food. Unfortunately, cultures were not obtainable from these patients for study of the type of organism.

SUMMARY

1. One thousand fifteen blood sera from pregnant women were tested by the agglutination reaction with *Brucella abortus* and *Brucella melitensis* antigens.

Of this number none gave definitely positive and only 5 weakly positive reactions. The indicated conclusion is that *Brucella abortus* infection is not generally prevalent in pregnant women in Chicago.

2. Blood sera from 22 women who had aborted gave negative results by the agglutination test with *Brucella abortus* and *Brucella melitensis* antigens. In the twenty-third case the aborted blood gave a positive reaction in a dilution of 1-80, while the venous blood test was negative. Cultures from the placental material also gave negative results.

In a later paper we will give a more complete report on the relation of the Genus *Brucella* to human abortion in Chicago.

3. Of the six clinical cases of undulant fever confirmed in the Health Department Laboratory, only one patient was a female. This patient had given birth to a normal child at full term three months before becoming ill and gave no history of a previous abortion.

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122 SOUTH MICHIGAN AVENUE.

PREGNANCY COMPLICATED BY AMYOTROPHIC LATERAL SCLEROSIS*

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(From the Clinic of the Woman's Hospital)

I AM reporting this case because, in a search of the literature of the past twelve years, I have been unable to find any references to the occurrence of pregnancy in patients with this disease.

Amyotrophic lateral sclerosis is not uncommon, as evidenced by the constant presence of several cases on the Neurologic Service at Bellevue Hospital. It usually affects those in the middle part of adult life; it does, however, according to standard textbooks, occasionally occur during the childbearing period. From this fact the following question seems pertinent: If it does take place during the childbearing period and the patient becomes pregnant, should the pregnancy be terminated? And further, if it should not be interrupted, what is the outcome of the pregnancy as regards the condition of the mother and baby?

Inasmuch as this patient was unable to talk distinctly, the following history was obtained from the husband. Mrs. E. C., aged thirty-nine years, believing she was in active labor, was admitted to the Woman's Hospital February 16, 1926. She came from healthy parents and her past history was essentially negative. Menses started at fourteen years of age, were always normal, and her last regular period was eight months ago, June 9, 1925. She has been married twenty-five years and has had nine full-term children, all spontaneously delivered, seven of whom are living.

Her present illness started about six months after the delivery of her last baby six years ago. At that time she began to notice a weakness and clumsiness in her hands and arms which became progressively worse and later involved her lower extremities so that she became bedridden. In addition, during the past year and one-half she has partially lost the power of speech and the ability to masticate food.

This condition was diagnosed and treated by Dr. Irving Pardee, at St. Luke's Hospital, shortly after its onset. More than a year ago, however, her condition was pronounced hopeless. Nevertheless, so far as the husband has been able to observe, there has been no marked change in her condition since she became pregnant eight months ago.

Examination reveals the following: Patient is a well-developed and well-nourished woman, but whose speech is slurring and indistinct, who is unable to close her mouth or masticate food, who drools constantly, who has difficulty in swallowing, has exaggerated reflexes and who presents marked weakness and incoordination of the movements and marked muscular atrophy of the hands, arms, feet, and legs.

Abdominal examination presents a symmetrically enlarged, gravid uterus about the size of a thirty-six weeks' pregnancy. The attitude, size of the fetus, fetal

*Read by invitation before the Obstetrical and Gynecological Section of the New York Academy of Medicine on March 26, 1929.

movements, and fetal heart were normal. Urinalysis was normal and the systolic blood pressure was 120.

The day after admission to the hospital she was seen in consultation and the diagnosis confirmed of amyotrophic lateral sclerosis with early bulbar palsy.

Inasmuch as the patient was not in labor she refused to remain in the hospital. Ten days after her discharge she was admitted to the Jewish Memorial Hospital where, after an easy labor of only two hours, she was delivered of an eight-pound normal baby. Following delivery the uterus acted normally, there was only the usual blood loss and after a normal puerperium of ten days' duration she was discharged.

For a period of six months following delivery, the husband states that his wife seemed to improve, as it was apparent that the movements of her hands and arms increased and she was more easily fed. Subsequently, however, her condition gradually became worse and she died August 5, 1928, two and one-half years after the birth of her baby.

At birth the baby was apparently healthy in every respect. Since then he has maintained perfect health, has made normal progress and at the present time is three years old and as strong and healthy as the average baby at this age.

DISCUSSION

Amyotrophic lateral sclerosis is a disease of the central nervous system. It does not affect the reproductive organs. There is, therefore, no reason why women with this disease who are in the childbearing period should not become pregnant. It follows, also, that the probability of these women, hopelessly paralyzed as they are, going through pregnancy uneventfully and of delivering spontaneously a healthy baby is the same as for any normal woman. The same is true of interrupting the pregnancy. This should not be done because, in itself, this procedure would be more dangerous to the mother than allowing the pregnancy to continue; because the disease always terminates fatally the continuation of the pregnancy does not affect the mother's prognosis; and finally, because the likelihood of obtaining a normal baby is probably as great as in a normal woman.

121 EAST SIXTEENTH STREET.

REPORT OF A CASE OF KRUKENBERG'S TUMOR

BY M. W. SEARIGHT, M.D., F.A.C.S., MEMPHIS, TENN.

MRS. S., aged forty-nine, was admitted to the medical service of the Baptist Memorial Hospital, March 27, 1927, complaining of pain beneath the ribs and swelling of the abdomen. The pain began two years ago. Six weeks prior to admission it was greatly exaggerated and was associated with gradual enlargement of the abdomen which had reached the proportions of a full-term pregnancy. She had practically no gastrointestinal symptoms except moderate constipation which was easily corrected by an occasional laxative. Slight dyspnea on exertion, but no orthopnea. No fever or cough but an occasional headache. Smarting pain was felt after micturition but no frequency; nocturia one to three times. Past illnesses were irrelevant except for several malarial attacks. Used coffee and snuff in rather large amounts. Menses began at age of thirteen, were of the thirty day type, not painful, three day flow. Slight diminution in amount for the last year. Had ten children, normal deliveries. No miscarriages.

The physical examination was essentially negative except for the abdomen which was markedly distended. All the signs of free fluid were present.

A working diagnosis of atrophic cirrhosis of the liver was made, and the abdomen was tapped to allow more satisfactory palpation and to relieve distention, as well as to study the character of the fluid itself. One hundred and twenty-eight ounces of bile-stained, turbid fluid were withdrawn. Following paracentesis, it was found that the liver and spleen were not palpable, but there was a large mass of firm consistency in the pelvis.

Vaginal examination confirmed the abdominal findings, and gynecologic consultation was requested. The pelvic findings were as follows: Perineum lacerated; cervix lacerated, large and fixed in the vaginal axis. The uterus was asymmetrically enlarged, nodular, and fixed in retroversion. There was a mass like a small bunch of grapes in the culdesae. The entire pelvis was tender. It was believed that we were dealing with a fibroma of the uterus complicated with adenocarcinoma, which would account for the delayed menopause and spotting, and metastasis to the peritoneum to account for the ascites. Advised exploratory incision lest the entire condition be benign, such as fibroma of the ovaries since it had lasted over a period of two years without causing appreciable cachexia.

The abdomen was opened April 12. The ovaries were found to be enlarged and nodular, about the size of small oranges. The tubes were apparently normal; the uterus was retroverted. On the left side, in the peritoneum along the brim of the pelvis were a number of small nodules similar to the ovarian tumors. A subtotal hysterectomy and bilateral salpingo-oophorectomy were done. The patient's condition did not warrant further exploration.

There was a severe postoperative reaction which necessitated the use of intravenous saline. The wound healed by first intention. On the seventh day after operation the temperature rose to 103° F., and there was tenderness over both kidneys. She was treated for pyelitis, with only slight improvement. On May 2, it was evident that the abdomen was refilling with fluid, and five days later 3000 c.c. of cloudy yellow fluid were withdrawn. The patient gradually became unable to take food of any kind. Death occurred May 15, 1927, a little more than thirty days postoperative.

Pathologic Report.—The specimen consisted of the uterus, amputated supravaginally with both tubes and two pale, nodular masses, which had apparently

developed from the ovaries. The larger growth measured $10\frac{1}{2}$ by 7 by 5 cm. and weighed 237 gm. The cut surface had a greyish-yellow appearance which consisted of fibrous tissue separating areas which were soft and yellow. A few small cysts were present. The smaller mass measured 7 by $5\frac{1}{2}$ by 5 cm., weighed 97 gm., and had the same nodular appearance as the larger mass. The cut surface had about the same appearance as the larger mass, but was somewhat denser in consistency. The uterus showed a few vascular adhesions, and there was considerable arteriosclerotic change in the wall. The mucosa was thin and leathery. Microscopically, the ovarian tumors showed small groups of large round cells with mucoid contents which compressed the nucleus into a signet ring form. These groups were surrounded by fibrous tissue.

Diagnosis.—Fibrosarcoma mucocellulare carcinomatodes of Krukenberg.

The ascitic fluid showed no growth in twenty-four hours. A trace of bile was present. Microscopically, there were many large endothelial cells undergoing degeneration. No mitotic figures were found. There were also many lymphocytes and a few polymorphonuclear cells. The urea-nitrogen was 11.44 mg. per 100 c.c.; the nonprotein nitrogen was 26.55. Wassermann negative. Sedimentation time to 111-12 minutes. Repeated smears for malaria were negative. White blood counts ranged from 5,300 to 11,000.

Autopsy was done May 4, 1927. Briefly the findings were as follows:

The stomach was found to be much thickened and contracted. The lesion began at the cardia and extended around the lesser curvature through the pylorus. In some places the stomach wall reached a thickness of $2\frac{1}{2}$ cm., and was cut with considerable difficulty. The mucosa was thrown into folds and nodular elevations. It was free from ulceration. The pylorus was fixed by adhesions. The pyloric lymph nodes were enlarged, pale, and indurated. Extensions to the peritoneum had given rise to fibrous thickening, constricting the intestine, and causing marked cicatricial contraction of the omentum. The retroperitoneal glands along the course of the aorta were markedly enlarged and indurated. There were about twenty of these nodes along the superior border of the pancreas, superior surface of the diaphragm, and scattered through the mesentery. The appendix was hard and rigid, 1 cm. in diameter. The cystic duct and neck of the gall bladder were also infiltrated by extension of the growth, forming a pale rigid tube about 2 cm. in diameter. The terminal ileum was covered with dense adhesions and could not be freed. There was an abscess cavity which apparently communicated with the bladder. Both kidneys were slightly enlarged and contained multiple small abscesses. The spleen and liver were apparently negative. The peribronchial lymph glands were enlarged. The entire colon was collapsed.

Microscopic examination of the stomach revealed new tissue, chiefly in the submucosa, and the muscularis was also much thickened and traversed by opaque bands of fibrous tissue. There was a diffuse infiltration of large, granular, acidophilic, vacuolated cells with large nuclei. Glands from the superior border of the pancreas showed the gland-like arrangement of adenocarcinoma through which black pigment was scattered. The retroperitoneal, mesenteric glands and along the diaphragm were infiltrated with cancerous cells similar to those found in the stomach. The appendix had become obliterated, and the cystic duct was partially obstructed by metastatic involvement. A small node in the mesoappendix was also malignant, as well as the peribronchial nodes.

Anatomic Diagnosis.—Carcinomatosis, apparently primary in the stomach.

A COMPARISON OF THE RESULTS OBTAINED IN THE INDUCTION OF LABOR BY MEANS OF BOUGIE OR BAG

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(From the Department of Obstetrics, Johns Hopkins Hospital and University)

INTRODUCTION

DURING the latter part of 1927, within a few days of each other, three cases of prolapsed cord with stillborn babies occurred, after labor had been induced for toxemia by means of the Voorhees bag. These unfortunate results aroused our interest and led us to inquire whether the best interests of the patients had been served.

With this in mind, we have critically studied the results obtained in the Clinic during the past twenty years (1908-1928), when labor was induced by means of the bag or bougie respectively, in the hope that some conclusion could be reached as to which method gives the most satisfactory results.

Dr. Williams has for years contended that it was his impression that better results followed the use of the bougie for the induction of labor in pregnant women who did not present signs of antepartum bleeding, and when haste is not essential; and this study will serve to confirm or refute such a belief.

A few preliminary statements are necessary before giving actual figures. In the first place, only cases of straight induction are considered; no instance in which a bag was inserted for one reason or another *after* the onset of labor is included. Second, the cases cover all periods of pregnancy after the twentieth week, and include all indications except antepartum bleeding, due particularly to placenta previa and premature separation of the normally implanted placenta. Patients presenting these latter complications are excluded because it is felt that they present an entirely different problem.

A word should be said concerning the type and size of the bags and bougies in use in this Clinic. We use routinely the Voorhees bag, which varies in size from 5 to 10 cm. in diameter across the top; the largest bag possible is used. It may be said here that we are unable to correlate the success of the induction with the size of the bag, as in all but a few of the cases reported the largest bags were used (8 to 10 cm. in diameter). The bougie in use is the Wales bougie. This is a rubber rectal tube with a small lumen and relatively thick walls, stiff enough to be introduced without the aid of a stylet, and still soft enough to adapt itself to the contour of the uterine cavity. The sizes commonly used vary from 1.5 to 3 cm. in diameter, and it is our custom

to employ the largest size possible, or else to introduce several smaller ones. Stress is laid upon the type of bougie employed, since to most persons the term suggests the fabric structures which were formerly so generally used in urology.

Further, a word should be said concerning the method of inserting the bag or bougie. The bag is folded and made as small as possible; it is grasped by a specially constructed forceps (similar to the sponge stick forceps but different in that the blades can be disarticulated), and introduced into the uterus extraovularly whenever possible by means of a bivalve speculum or by the sense of touch alone, depending upon the preference of the operator. Upon removing the forceps the bag is completely filled with sterile saline, the hand remaining in the vagina until the operation is complete to insure that the bag remains in place. The bougie should always be inserted through a speculum, extraovularly if possible; it is inserted into the uterus for almost its entire length, 2 to 3 cm. only protruding through the cervix; the vagina is then packed with gauze to hold it in place. Both procedures are carried out without anesthesia whenever possible, particularly in cases of toxemia, and it is surprising how few patients require the administration of an anesthetic. The bag or bougie is never allowed to remain in place for longer than twenty-four hours, on account of the danger of infection.

THE BOUGIE

Upon analyzing our figures, it was found that an attempt was made to induce labor by means of the bougie in 160 cases, which was successful in 132 cases, or 82.5 per cent. In Table I (A) are given the indications

TABLE I (A)

INDICATIONS FOR INSERTION OF BOUGIE	MATURE 85 CASES		PREMATURE 36 CASES		IMMATURE 39 CASES		TOTAL
	SUCCESS- FUL	FAILED	SUCCESS- FUL	FAILED	SUCCESS- FUL	FAILED	
A. Nephritis and nephritic toxemia	7	1	7	5	11	2	33
B. Preeclampsia	19	1	8	0	4	0	32
C. Toxemia, low reserve kidney	7	0	5	3	3	1	19
D. Eclampsia	4	0	1	1	5	0	11
E. Tuberculosis	0	0	0	0	2	3	5
F. Cardiac	3	0	2	0	2	1	8
G. Prolonged pregnancy, excessive size of child, disproportion	29	7	0	0	0	0	36
H. Pvelitis	0	0	2	0	2	0	4
I. Miscellaneous: hydramnios, dead fetus, cancer, neuritis, psychosis, missed abortion, cholelithiasis	6	1	1	1	2	1	12
Totals	75	10	26	10	31	8	160
Efficiency	88.2%		79.2%		79.5%		82.5%

for which the inductions were attempted. From it, will be seen that the cases are divided into three groups, patients at or near term (with fetus weighing 2500 gm. or more), patients with premature babies (weighing 1500 to 2500 gm.), and patients with immature or nonviable babies (weighing less than 1500 gm.). The number of successful and unsuccessful cases are given for each group. As might be expected, the bougie was most efficient in the first group, the percentage of success being 88.2. On the other hand, it was less efficient in the other two groups, in which the results were negative in about one case in five.

In the great majority of cases the main indications were toxemia and prolonged pregnancy, the percentage of success being 87.1 for the former, and 80.6 for the latter.

Of the 132 cases in which labor followed the insertion of the bougie 96 were delivered spontaneously, a percentage of 72.7. But when we figure the percentage of total number of inductions attempted which finally delivered spontaneously the figure falls to 59.6 per cent, which represents the expectancy of spontaneous delivery when we set out to induce labor by means of the bougie. In the 27 per cent of cases which did not end spontaneously, labor was terminated by forceps, version and extraction, and occasionally by craniotomy, depending upon the indication.

FETAL MORTALITY

Deducting 33 cases in which the fetus was dead or nonviable at the time of insertion of the bougie, there remain 99 cases on which to figure the fetal mortality. In this group there were 16 stillborn babies, and 2 babies who died a few hours later, a total of 18. Ten of the 18 deaths occurred in cases ending spontaneously, and 8 in those ended by supplementary operation. One of the 8 operations was done for prolapsed cord, and in three other cases, the operation must be held re-

TABLE I (B). FETAL DEATHS

TYPE OF CASE OR CAUSE OF FETAL DEATH	MATURE 85 CASES	PREMATURE 36 CASES	IMMATURE 39 CASES	TOTAL
Prolapsed cord	2	0		2
Eclampsia	2	1		3
Preeclampsia	2	1		3
Nephritis	0	5		5
Cardiac	0	1		1
Unexplained	1	0		1
Totals	7	8		15
Mortality	9.3%	32%		15.06%
Killed by operation	3	0		3
Dead or nonviable	2	1	30	33

TABLE I (C). MATERNAL RESULTS

Morbid	18	10	9	37
Dead	1	1	2	4

sponsible for the death of the baby; in two of them craniotomy was done after failure of forceps or version. The remaining 4 operations were incidental, such as low forceps.

Reference to Table I (B) will show the cause of the fetal death, and the type of case in which it occurred. Obviously, all the fetal deaths are not attributable to the method of induction employed. Thus, if we exclude the 3 cases in which operation was responsible for the fetal death the mortality is 15.06 per cent, but if we exclude the toxemias as well, the mortality falls to 4 per cent. The fetal mortality for the mature group is only 9.3 per cent as compared with 32 per cent for the premature group. All but one of the fetal deaths in the latter group occurred in cases of severe toxemia or nephritis, a consideration which shows what large factors toxemia and prematurity are in the production of fetal mortality.

MATERNAL MORBIDITY AND MORTALITY

Thirty-seven of the 132 cases had febrile puerperia, but as three of them showed signs of infection at the beginning of the induction they must be deducted in calculating the maternal morbidity (a rise to 100.4° F. or more on any two days after the first). Furthermore, the fact that the temperatures are taken every four hours increases the rate of morbidity considerably. The maternal morbidity is thus 18.6 per cent.

There were 4 maternal deaths. One patient died of subacute bacterial endocarditis (Unit 3950) and one of uremia (Service No. 8043), so that neither of them can fairly be called obstetric deaths. Of the other two, one died of a gas bacillus endometritis, and the other suffered a ruptured uterus, later dying of peritonitis.

Clinic No. 8797½, F. H. The patient was a colored multipara, aged forty-two, whose last menstrual period occurred on Feb. 15, 1917. She had been followed in the Dispensary for about six weeks before admission to the hospital. When first seen she presented signs of severe toxemia of pregnancy, with blood pressure 210/120, albumin 2+, marked edema of the extremities, and complaining of occasional severe headache. She was advised to enter the hospital, but refused to do so. She was seen on several occasions thereafter, the signs and symptoms of the toxemia being a little worse at each successive visit. Finally a few days before admission she began to have epigastric pain, to be nauseated and to vomit; the fetal movements ceased; dimness of vision appeared; the patient became alarmed and entered the hospital Sept. 27, 1917, when the blood pressure was 190/100, and the urine contained many casts and 4 gm. of albumin per liter. The uterus corresponded in size to an eight months' gestation, and the temperature was normal. On September 29, after failure to induce labor by means of castor oil and quinine, a bougie was inserted, and an 1800 gm. macerated fetus possessing an exceedingly foul odor was born fifteen hours later. The toxemia immediately improved, but on the day following delivery the temperature rose to 100.4, pulse 110; and from then onward the temperature and pulse remained elevated, with occasional remissions. The patient seemed well until October 4, when she began to act queerly, refusing to see her relatives. She gradually became stuporous, her urine was

bloody and contained pus, there appeared a conjugate deviation of the eyes, and she could not be aroused. The stupor gradually increased until she died a few hours later. At autopsy it was found that she had an acute endometritis, thrombosis of the innominate vein and right carotid artery, beginning arteriosclerosis, myocardial degeneration and edema of the lungs. Cultures of the uterine contents grew out gas bacillus, *Staphylococcus aureus*, and *Bacillus coli*.

The second case which resulted in death was as follows. Clinic No. 11,375, M. O. The patient was a colored woman, aged thirty-four, whose single previous pregnancy had ended in spontaneous abortion at three months. She was admitted to the hospital on Sept. 22, 1921, about six and one-half to seven months pregnant, with a history of increasing symptoms of toxemia for six weeks. On that morning, she awoke with severe headache, epigastric distress, and dimness of vision. Twenty minutes after admission she had a third and last convulsion. Venesection and hot packs brought about temporary improvement. Two days later because of rising blood pressure it was decided to induce labor by means of the bougie. The cervix was found to be tightly closed; it was dilated with the Goodell dilator before the bougie could be inserted. Ineffectual pains ensued after a few hours. On the following day, the bougie was removed and a bag introduced in order to hasten labor. The temperature at this time was 102° F. A 1120 gm. macerated fetus was expelled after seven hours. Four days later the toxemia was much improved, but the temperature and pulse remained elevated and continued so until death occurred on the eighth day. Autopsy revealed a rupture of the lower uterine segment into the left broad ligament, which contained a sizable abscess cavity, which again had ruptured into the peritoneum, leading to a generalized peritonitis. A note by Dr. Williams at the time suggests the Goodell dilator as being the probable cause of the ruptured lower segment. Additional findings at autopsy were subacute nephritis, moderate anasarca, cloudy swelling of liver and spleen.

These two deaths must obviously be laid to the insertion of the bougie, and constitute a maternal mortality of 1.3 per cent. See Table I (C).

PROLAPSED CORD

In the bougie inductions prolapse of the cord occurred six times, an incidence of 4.5 per cent. In two instances the child was nonviable, in two others live children were born in spite of the prolapsed cord. In the remaining two cases, the membranes had been ruptured accidentally before the cervix became fully dilated. In one case this occurred when the bougie was inserted, while in the other it occurred when a bag was inserted to hasten dilatation when the cervix was 4 cm.; both babies were stillborn. In other words, two of the 18 fetal deaths were really attributable to prolapsed cord following early rupture of the membranes.

MEMBRANES

An attempt was made to correlate the occurrence of prolapse of the cord and febrile puerperia with the time at which the membranes ruptured. Table II presents an analysis of our findings with these points in mind. It shows that accidental rupture of the membranes occurred 16 times, or in 12 per cent of the cases; while in 3 others the membranes were ruptured intentionally before the cervix had become fully dilated

in the hope of hastening the course of labor. In this group of 19 cases, 3 of the 6 prolapsed cords occurred, and these included the two instances in which the children were stillborn.

TABLE II. BOUGIE. CORRELATION OF PROLAPSE OF THE CORD AND THE FEBRILE PUERPERIA WITH THE TIME OF RUPTURE OF THE MEMBRANES

TIME OF RUPTURE	CASES	PROLAPSED CORD	STILL-BORN	DEAD OR NONVIABLE	FEBRILE PUERPERIA
1. Before insertion of bougie	2	0	1	0	2
2. At insertion of bougie	16	2	1	3	2
3. Artificially before full dilatation	3	1	1	2	0
4. In course, at or after full dilatation, at operation	94	1	12	23	27
5. Unknown	17	2	3	5	6
Totals	132	6	18	33	37

Contrary to our expectations the great majority of febrile puerperia occurred in two rather unspecific groups; namely, in that in which the time of rupture of the membranes was unknown (5), and in group 4 in which the membranes had ruptured spontaneously during the course of labor, or had been ruptured artificially after full cervical dilatation. Naturally, when rupture of the membranes occurred at insertion of the bougie, it was accidental; but obviously, such an accident must increase the likelihood of prolapse of the cord and of fetal death.

TIME REQUIRED FOR INDUCTION AND DURATION OF LABOR

Table III shows the length of time elapsing between the introduction of the bougie and the onset of labor, as well as the duration of labor after the pains have begun.

TABLE III. BOUGIE

	TIME FOR INDUCTION			DURATION OF LABOR		
	MULTIP- ARAE	PRIMIP- ARAE	TOTAL	HOURS	AVERAGE	
1. Immediate or in less than one hour	12	6	18	1. Operative	18.2	
2. Average time for others (hours)	5.95	6.85	6.4	2. Spontaneous	12.4	
				3. Multiparae	11.3	
				4. Primiparae	17.1	14.2

It will be noticed that pains set in within the first hour in 14 per cent of the cases, while on the other hand this did not occur until after the lapse of twenty-four hours in other cases. The average for the entire number of cases was six and four-tenths hours, leaving out of account the cases in which the induction failed entirely. Furthermore, it should be remembered that it is our practice never to allow the bougie to remain in place for more than twenty-four hours.

The average duration of labor was fourteen and two-tenths hours. The primiparous labors were six hours longer than the multiparous, a difference which corresponds to that usually stated in textbooks. On

the other hand, the operative labors were six hours longer than the spontaneous deliveries, which is due to the fact that these patients were allowed to continue in labor until some definite indication for interference arose.

THE BAG

A bag was inserted in the attempt to induce labor in 49 cases, and was successful in 46, an efficiency of 93.8 per cent. It is noteworthy that the three failures occurred in patients in whom a bougie had previously been inserted and had failed to bring about the onset of labor. Twenty-seven of the 46 successful cases ended in spontaneous delivery, a percentage of 58.8. As 27 is 55.1 per cent of 49 (the total number of inductions attempted), this figure must be regarded as representing the expectancy of spontaneous delivery when the bag is used.

In Table IV (A) are detailed the successes and failures occurring under each of the various indications, and these are again divided according

TABLE IV (A)

INDICATIONS FOR INSERTION OF BAG	MATURE 24 CASES		PREMATURE 18 CASES		IMMATURE 7 CASES		TOTAL
	SUCCESS- FUL	FAILED	SUCCESS- FUL	FAILED	SUCCESS- FUL	FAILED	
A. Failure of bougie	4	1	6	1	3	1	16
B. Preeclampsia	0	0	1	0	0	0	1
C. Toxemia, low reserve kidney	1	0	0	0	0	0	1
D. Eclampsia	4	0	3	0	1	0	8
E. Tuberculosis	1	0	0	0	0	0	1
F. Nephritis and nephritic toxemia	4	0	4	0	1	0	9
G. Pyelitis	0	0	0	0	1	0	1
H. Diabetes	1	0	0	0	0	0	1
I. Prolonged pregnancy, excessive size of child, etc.	7	0	0	0	0	0	7
J. Miscellaneous, intra- partum infection, ab- normal presentation, anemia	1	0	3	0	0	0	4
Totals	23	1	17	1	6	1	49
Efficiency	95.8%		94.4%		85.7%		93.8%

as the pregnancy was mature, premature, or immature. As was to be expected, the efficiency of the method was found to be greater in the mature and premature groups, the percentage of success being 95 per cent for the former two as compared with 85 per cent for the latter. The number of cases is small and therefore such figures cannot be regarded as absolute.

As will be noted the various types of toxemia constituted the most common indication, and in the 19 cases there were no failures. The next indication was failure to induce labor by means of the bougie, 16 cases with 3 failures; while the only other indication of considerable

frequency was prolonged pregnancy of which there were 7 cases, all successful.

FETAL MORTALITY

In 14 instances the fetus was dead or nonviable at the time of insertion of the bag, thus leaving 32 cases upon which to calculate the fetal mortality; and in these, 12 children were stillborn and three died shortly after delivery. Of the 15, 5 were born spontaneously and 10 by operative means. Four of the 10 operations were necessitated by prolapse of the cord, while in 5 other cases the child died during the course of the operative procedure (version and extraction 3, midforceps 1, breech extraction 1).

TABLE IV (B). FETAL DEATHS

CAUSE OF FETAL DEATH OR TYPE OF CASE	MATURE 24 CASES	PREMATURE 18 CASES	IMMATURE 7 CASES	TOTAL
Prolapsed cord	4	2		6
Eclampsia	1	1		2
Nephritis	1	1		2
Total	6	4		10
Mortality	26.1%	23.5%		31.2%
Killed by operation	2	3		5
Dead or nonviable	4	3	7	14

TABLE IV (C). MATERNAL RESULTS

Morbid	7	9	2	18
Died	0	1	0	1

Table IV (B) shows in detail the cause of the fetal death and the type of case in which it occurred. Deducting operative mortality, the fetal mortality is 31.2 per cent. If we deduct the toxemias as well, this falls to 18.7 per cent, and there is some justification for so doing, because only the 6 deaths due to prolapse of the cord can be directly attributed to the method of induction. The fetal mortality for the premature group is slightly less than for the mature group, 23.5 and 26.1 per cent respectively, which is explained by the fact that 4 of the 6 fetal deaths from prolapsed cord fell in the latter group.

MATERNAL MORBIDITY AND MORTALITY

In 18 cases, the puerperium was febrile, not including the cases in which intrapartum infection afforded the indication for interference, so that the maternal morbidity is 37.7 per cent. If we correlate the morbidity with the number of manipulations, it is very graphically shown that the greater the number of the latter, the higher becomes the incidence of infection (Table VII). There was one maternal death from peritonitis following vaginal hysterotomy after both bougie and bag had failed to complete the labor (U. 3762), giving a maternal mortality of 2.1 per cent.

PROLAPSED CORD

The cord prolapsed in 8 cases, an incidence of 17.4 per cent, and in 6 of these the child was stillborn. In 5 cases in this group the membranes were ruptured accidentally at the time of insertion of the bag; in another case they had ruptured prematurely before the induction was begun; while in the remaining two they were ruptured artificially by the obstetrician during the course of labor, before full dilatation. Incidentally it might be said that 4 of the 6 stillbirths probably resulted from the operative procedures undertaken in the hope of saving the child.

MEMBRANES

As in the case of the bougie, an attempt was made to correlate prolapse of the cord and febrile puerperia with the time of rupture of the membranes. Table V shows several remarkable facts: the membranes were

TABLE V. BAG. CORRELATION OF PROLAPSE OF THE CORD AND THE FEBRILE PUERPERIA WITH THE TIME OF RUPTURE OF THE MEMBRANES

TIME OF RUPTURE	CASES	PROLAPSED CORD	STILL-BORN	DEAD OR NONVIALE	FEBRILE PUERPERIA
1. Before insertion of bougie	5	1	2	1	2
2. At insertion of bougie	2	2	2	0	1
3. At insertion of bag	14	3	6	3	7
4. Artificially before full dilatation	3	1	2	0	3
5. In course, at or after full dilatation, at operation	18	1	3	6	3
6. Unknown	4	0	0	4	2
Totals	46	8	15	14	18

ruptured accidentally at the insertion of the bougie or bag in 16 cases, while in 3 others the membranes were ruptured purposely before full dilatation in the hope of hastening the course of labor. In this group of 19 cases (41.3 per cent of the total number of successful inductions), fall 11 of the 18 febrile puerperia, 6 of the 8 prolapsed cords, and 6 of the 8 stillbirths. These figures show conclusively how extraordinarily serious it is to rupture the membranes before full dilatation when the bag is employed, although it must be appreciated that in many cases it is often extremely difficult to insert a bag without rupturing them.

TIME REQUIRED FOR INDUCTION AND DURATION OF LABOR

The figures in Table VI show the time elapsing between the insertion of the bag and the onset of labor, as well as the average duration of

TABLE VI. BAG

TIME FOR INDUCTION			DURATION OF LABOR		
MULTIPARAE	PRIMIPARAE	TOTAL	HOURS AVERAGE		
1. Immediate or in less than one hour	15	9	24	1. Operative	14.3
2. Average time for others (hours)	5.14	4.53	4.42	2. Spontaneous	8.1
				3. Multiparae	8.3
				4. Primiparae	14.2
					11.72

TABLE VII. BAG. SHOWING THE RELATION OF MATERNAL MORBIDITY TO INTRAUTERINE MANIPULATIONS

	AFEBRILE	FEBRILE	TOTAL
One manipulation	16	5	21
Two or more manipulations	11	12	23
Excluding 2 cases of intrapartum infection			44

labor. It is seen that pains set in in less than one hour after the insertion of the bag in approximately 50 per cent of the cases, while in the other half the average time was four and forty-two hundredth hours, although as long as twenty hours was required on several occasions. The duration of labor was from three to four hours shorter than when the bougie was used, although the difference in the duration of the multiparous and primiparous labors, as well as the spontaneous and operative labors remained essentially the same.

COMPARISON OF THE TWO METHODS

In Table VIII the results of the two methods are compared in detail.

TABLE VIII. COMPARISON OF THE TWO METHODS

	BOUGIE		BAG	
	CASES	PER CENT	CASES	PER CENT
<i>General</i>				
1. Total number of cases	160		49	
2. Successful cases	132	82.5	46	93.8
3. Spontaneous delivery	96	72.7	27	58.8
4. Expectancy of spontaneous delivery		59.6		55.1
5. Breech presentation	3	2.3	7	15.2
<i>Fetal Mortality</i>				
1. Gross mortality	18	18.1	15	46.9
2. Mortality minus operative mortality	15	15.06	10	31.2
3. Mortality minus operative and toxemia mortality	4	4.0	6	18.7
<i>Maternal Morbidity and Mortality</i>				
1. Morbidity	34	18.6	17	37.7
2. Mortality, obstetric	2	1.3	1	2.1
<i>Prolapsed Cord</i>				
1. Total number, incidence	6	4.5	8	17.4
2. Stillborn babies	2		6	
<i>Rupture of Membranes</i>				
1. Accoucheur responsible	19	14.4	19	41.3
2. Prolapsed cords in this group	3	50.0	6	75.0
3. Stillborn in this group	2	13.3	8	80.0
4. Febrile puerperia in this group	2	5.4	11	64.7

The following points are deserving of comment: The bag was the more efficient of the two methods, though by not a great deal, 93.8 per cent as compared with 82.5 per cent. On the other hand, it appears that a considerable point in favor of the bougie is the much greater percentage of spontaneous delivery (72.7 per cent and 58.8 per cent). Even when

the greater proportion of failures following attempted induction by means of the bougie is taken into consideration, it appears that the actual expectancy of spontaneous labor is still a trifle greater than with the bag (59.6 and 55.1 per cent).

The fetal results are distinctly in favor of the bougie, although neither method gives ideal results. The mortality for bag induction, considering gross fetal mortality, minus the operative mortality, as being the fairest estimate, was twice as great as with the bougie. Likewise the maternal morbidity was twice as great for the bag as for the bougie while the maternal mortality was essentially the same. On the other hand, the relative incidence of prolapse of the cord was four times greater with the bag than with the bougie.

Prolapsed cord, it is seen, was responsible for all the fetal deaths directly attributable to the method in the bag group, as compared with only one-half the fetal deaths in the bougie group. Obviously in both groups, early rupture of the membranes before full dilatation, at the insertion of either bougie or bag, or when done artificially later on, proved disastrous from all points of view. Particularly is this true for the bag, in which 75 per cent of the prolapsed cords, 80 per cent of the fetal deaths, and 64.7 per cent of the febrile puerperia followed too early rupture of the membranes. Moreover, it is shown clearly that the chance of rupturing the membranes at the time of insertion is much greater with the bag than with the bougie (34.7 per cent as compared with 12 per cent). This in itself is a considerable argument against the bag, especially in view of the results obtained in this particular group of cases. Finally, labor set in immediately after the insertion of the bag many times more frequently than after the bougie, and the time elapsing before the onset of pains, as well as the actual duration of labor, was definitely shorter.

It is an interesting commentary that the incidence of breech presentations was 15.2 per cent in the cases induced by the bag as compared with 2.3 per cent for the bougie group.

CONCLUSIONS

1. Our study shows that the bougie is superior to the bag for the induction of labor, provided a sufficiently large bougie is employed, and that it should be used whenever haste is not essential.
2. The bag is more efficient in bringing about the onset of labor, but is attended by a definitely greater fetal mortality and maternal morbidity.
3. When fetal death follows the use of the bag it is usually the result of prolapse of the cord.
4. The maternal mortality is the same with either method.

COMPLETE ATRESIA OF THE CERVICAL CANAL DURING PREGNANCY AS A COMPLICATION OF CERVICAL HYPERTROPHY

WITH THE REPORT OF A CASE

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COMPLETE atresia of the cervical canal during pregnancy as a complication of cervical hypertrophy is extremely rare. Of all the parturients admitted to the Philippine General Hospital from 1910 to 1928 (18,274 cases), only the case here reported presented this complication.

In the literature to date, which had been reviewed by Mathieu and Schaufler, only 27 cases of cesarean section were performed on account of cervical atresia and of these 6 were cases of obliteration of the cervical canal.

B. J., aged twenty-nine, para iv, was admitted to the Philippine General Hospital on September 24, 1928, in her ninth month of pregnancy. Previous labors were all prolonged and difficult, the first resulting in the spontaneous birth of an asphyxiated baby which soon died, and the second and third terminating in spontaneous stillbirths. Patient entered the hospital for delivery on account of previous difficult labors.

On investigating the possible cause of dystocia, the pelvic measurements were found to be normal but the vagina was occupied by a soft elongated tumor as large as a grapefruit which on closer examination was identified to be the cervix itself. The tumor was smooth and solid throughout its extent and only after careful search was a slight indentation felt on its upper and anterior right portion, which was taken to be the external os. With some effort it was made to admit a very fine probe 1 mm. in diameter as far as 1 cm. deep. This was followed however by much bleeding which made us wonder if the opening was not made artificially by the instrument. A Porro cesarean section was decided upon to be performed as soon as labor pains began. The patient however insisted on going home promising to return as soon as she felt labor pains.

On the twelfth day after examination, she returned with strong labor pains and with a temperature of 39° C. The cervical tumor had greatly increased in size so that while a large portion of it was still within the vaginal canal, a great deal of it had protruded outside the vulva. A Porro cesarean section was quickly performed under general anesthesia, but unfortunately the baby was found to be macerated. Total hysterectomy would have done away with the cervical tumor but as it was exposed to infection, it was thought safer to leave the cervix in situ.

During the first four days the vulvar pad was dry and free from any lochial secretion, but on the fifth day it was noticed to be stained with a slight sero-sanguinous discharge which gradually became whitish and increased in amount as the puerperium advanced.

During the puerperium the cervical tumor had shrunk considerably but it was still large enough to require amputation. On the eighteenth day, under spinal

anesthesia, the elongated portion beyond the tear, which was reduced to one inch long and three-fourths inch thick, was amputated and the remaining stump sutured, thus restoring the normal contour of the cervix as far as possible. Perineorrhaphy was also done. With the exception of a rise of temperature to 38° C. from the second to the fourth day, recovery was uneventful.

COMMENT

Various conditions have been described as the etiologic factors of cervical obstruction or occlusion. They are: (a) injury to the cervix

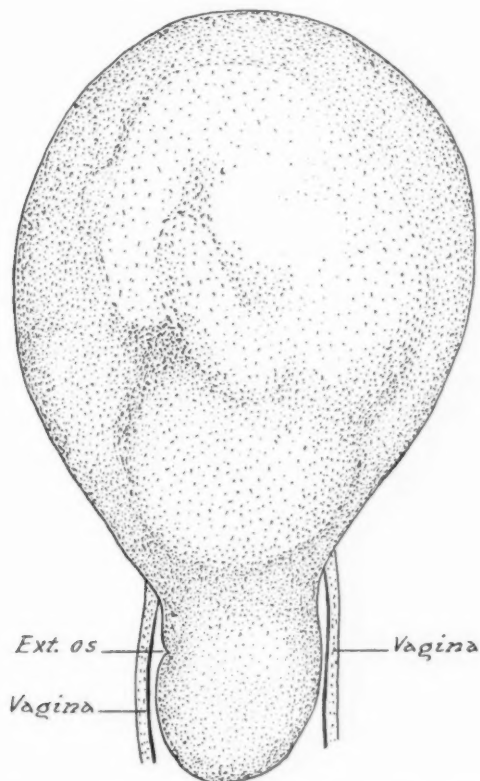


FIG. 1.—Diagrammatic view of the cervical tumor.

due to childbirth; (b) operations on the cervix such as dilatation and curettage, and trachelorrhaphy or high amputation of the cervix; (c) use of caustics in the treatment of cervical disease; (d) syphilis or chancre; (e) overlapping of the cervical lips; (f) faulty presentation unequally dilating the cervix; and (g) adhesions between the unruptured membranes and the cervical wall.

Of the above, only the first condition, namely, injury to the cervix caused by a previous labor was present in our case. Fig. 1 is a schematic drawing made of the condition of the cervix before the operation.

As to the modus operandi of the obliteration of the cervical canal. The

diagnosis of absolute occlusion of the cervical canal during pregnancy is at first disconcerting and incredible for one naturally questions that if such an obstruction really existed how could the woman have become impregnated?

The facts in our case are as follows:

1. There was complete occlusion of the cervical canal during the ninth month of pregnancy (when the patient was first seen), and throughout labor and early puerperium as proved by negative digital, ocular and instrumental tests and by the absence of lochia during the first four days of puerperium.

2. Concomitant with the occlusion was the large cervical tumor which distended and occupied most of the vaginal canal.

3. On the fifth day of puerperium, when the cervical tumor had much decreased in size for the first time, serosanguinous discharge began to appear, showing the patency of the cervical canal.

The foregoing facts lead us to explain that the occlusion of the cervical canal which developed after impregnation was not caused by any organic change in the canal itself but rather by the overgrowth of the surrounding tissue, which had reached its abnormal state under the stimulating influence of pregnancy. Once the gravid state had passed and the process of involution had fairly inaugurated itself with consequent recession of the hypertrophied cervical tissue, the patency of the canal became reestablished.

As to the method of delivery in cases of cervical occlusion or marked atresia where drainage through the cervical canal is nil or at most ineffective, it is believed that a Porro cesarean section at full term is the operation of choice, consistent with the welfare of both mother and fetus. Vaginal cesarean section should be confined only to cases of partial stenosis where the cervical canal admits two or more fingers and no tumor obstructs the pelvic canal.

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SEASONAL VARIATION IN THE WEIGHT LOSS OF NEWBORNS

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THIS study was undertaken to determine the influence of season of the year on the weight loss and the occurrence of fever in newborns. The data were obtained from the records of several thousand infants born at Bellevue Hospital over a period of years.*

SEASONAL VARIATION IN THE WEIGHT LOSS

The weight loss in newborn infants during the years 1926 and 1927 by months of the year and by sex is shown in Table I and Chart 1. Each curve is based on data obtained from over fifteen hundred in-

TABLE I. SEASONAL VARIATION IN THE WEIGHT LOSS OF NEWBORNS. BELLEVUE HOSPITAL 1926 AND 1927

MONTH OF YEAR	MALES			FEMALES		
	NO. OF BIRTHS	PERCENTAGE WEIGHT LOSS MEAN	P.E.M.*	NO. OF BIRTHS	PERCENTAGE WEIGHT LOSS MEAN	P.E.M.
January	123	8.57	0.22	138	9.09	0.17
February	118	9.17	0.22	149	8.76	0.17
March	148	8.76	0.18	136	8.34	0.19
April	136	8.15	0.18	119	9.16	0.20
May	138	8.40	0.19	155	8.25	0.18
June	136	7.82	0.18	139	8.00	0.20
July	156	7.48	0.15	140	7.75	0.18
August	184	7.53	0.16	127	7.24	0.15
September	127	7.50	0.18	153	7.56	0.17
October	157	8.10	0.15	131	7.95	0.17
November	141	8.78	0.19	103	7.90	0.21
December	144	7.74	0.14	117	7.94	0.19

*P. E. can be obtained by multiplying P.E.M. by the square root of the number of cases.

fants. The weight loss in both boys and girls born at Bellevue Hospital is considerably less during the summer than during the winter. This seasonal variation is constantly present for both years and for both sexes. The weight loss begins to diminish in June, remains low during the summer months and starts to rise in October. The weight loss during the summer months was about 15 per cent less than during the winter months, the loss during the summer months (July, August, and September) for both males and females averaging about 7.50 per

*These studies were made possible through the courtesy and cooperation of Dr. Frederick W. Rice and Dr. Hervey C. Williamson, to whom we wish to express our sincere appreciation.

cent of the birth weight, while during the winter months (January, February, and March) the average was about 8.78 per cent.

Since a relationship exists between the loss of weight in newborns and the birth weight, the heavier babies losing proportionally more than the smaller ones, the average birth weight for this series of infants was computed for each month during the years 1926 and 1927.

Adersen¹ noted a seasonal variation in the birth weight, the newborns being larger during the cold weather. Hansen² found that newborns were heavier during the fall than during the spring months. According to Abel³ newborns in Vienna, during the years following the war, weighed more during the summer than during the winter.

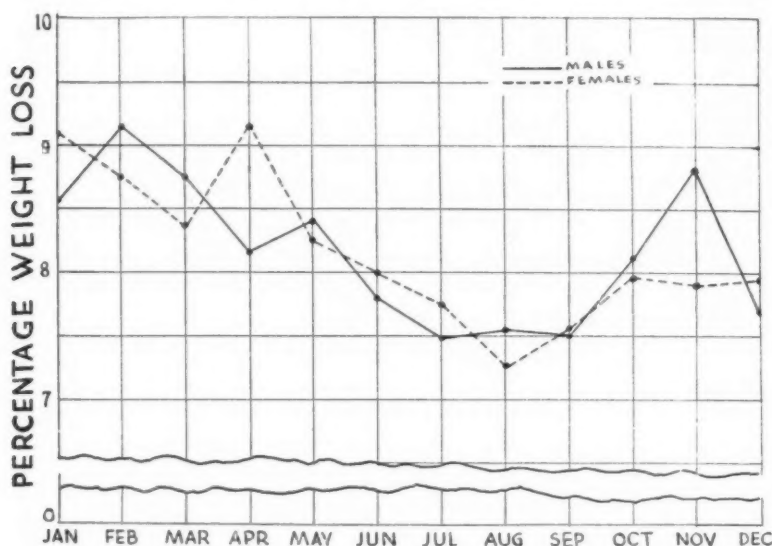


Chart 1.—Seasonal variation in weight loss of newborn infants, Bellevue Hospital, 1926, and 1927.

Brenton,⁴ and more recently Hellmuth,⁵ however, have been unable to find any seasonal variation in birth weight. In our series there was no constant seasonal fluctuation in the birth weight.

SEASONAL VARIATION IN FEVER

Adair and Stewart⁶ in a study made at the Swedish Hospital, Minneapolis, found that during the year 1921 there was a seasonal variation in the incidence of fever in newborns, the cases being much more frequent during the summer than during the winter. The summer of 1921 in Minneapolis, according to local weather bureau reports, was unusually warm, the external temperature at times ranging between 91° and 99° F. They suggested that high external temperatures have an influence on the frequency with which fever occurs in newborns. Tyson⁷ studied the incidence of fever in newborns at three hospitals in Philadelphia. He states that no regular seasonal variation occurred. His composite curve for the frequency of fever in the three hospitals,

however, as well as the individual curves, shows a lower incidence of fever during August and September than during the other months.

The incidence of fever (temperature of 37.8°C . and above) in newborns at Bellevue Hospital by months of the year and by sex during the years 1925, 1926, and 1927 is shown in Table II and Chart 2. As one might be led to expect from the seasonal variation in the weight loss, there is a marked seasonal variation in the incidence of fever, the cases occurring much more frequently during the winter than during the summer months. The incidence of fever starts to diminish in May, is low during June, July, and August, and starts to increase during September. Whereas the percentage of babies having fever during the

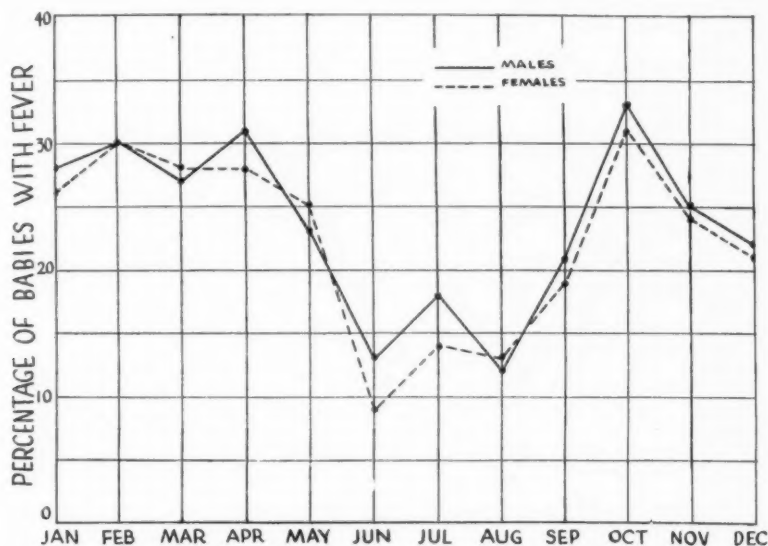


Chart 2.—Seasonal variation in the incidence of fever, Bellevue Hospital, 1925, 1926, and 1927.

winter months was usually between 25 and 30, the percentage of cases during the summer was usually below 15.

No determinable seasonal variations in the nursing care or in the water administration to newborns such as might influence the weight loss and incidence of fever were found.

In order to study the influence of temperature, humidity, etc., of the nursery on the weight loss, dry and wet bulb temperature readings were made in the newborn nursery at two-hour intervals over a period of seven months. During this period the weight loss during the first four days of life was studied in about 900 babies. The temperature range of the nursery was between 22 and 29°C . (72 and 84°F .), the effective temperature range⁸ between 18 and 25°C . (67 and 76.5°F .), the humidity range from 30 to 53, and the wet bulb depression from 11 to 19.5. No correlation was found between the weight loss on any

TABLE II. SEASONAL VARIATION IN THE INCIDENCE OF FEVER IN NEWBORNS, BELLEVUE HOSPITAL, 1925, 1926, AND 1927

MONTH OF YEAR	NUMBER OF BIRTHS						PER CENT OF NEWBORNS HAVING FEVER					
	1925, 1926, 1927		1925		1926		1925, 1926, 1927		1925		1926	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
All months	2685	2593	963	914	749	769	973	820	32	29	25	17
January	211	204	88	68	56	71	67	65	26	21	48	13
February	188	221	70	73	53	73	65	75	31	37	36	23
March	242	206	91	72	74	57	77	77	26	32	31	21
April	219	194	82	73	57	54	80	67	37	34	26	27
May	227	231	85	81	59	82	83	68	31	31	19	18
June	216	218	79	80	63	74	74	64	23	14	8	5
July	249	217	87	85	80	57	82	75	23	22	21	10
August	249	190	66	65	83	58	100	67	23	22	21	5
September	204	219	76	67	51	75	77	77	20	17	13	2
October	258	225	102	94	68	61	88	70	28	19	20	16
November	215	171	77	66	44	48	94	57	41	48	34	23
December	207	207	60	90	61	59	86	58	22	36	15	19

of the first four days of life and the nursery temperature, the humidity, the effective temperature, or the wet bulb depression.

Possibly the seasonal variations in weight loss and incidence of fever are due to seasonal variations in the secretion of colostrum.

SUMMARY AND CONCLUSIONS

1. A seasonal variation was noted in the weight loss and incidence of fever in newborn infants kept in a nursery at Bellevue Hospital. The infants lose considerably more during the winter than during the summer and have fever more often.

2. No correlation was found between the weight loss during the first four days of life and the nursery temperature, humidity, effective temperature, or wet bulb depression.

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Levy-Solal, Misrachi, & Solomon: The Pathogenesis of the Pyelonephritides of Pregnancy. La Presse Médicale, 577, May 7, 1927.

The authors noticed the frequency of stenoses and ureteral obstructions in the course of treatment of pyelonephritis of pregnancy by ureteral catheterization. They also observed that the renal pelves showed retention to a greater extent than is found in the pyelonephritis of the nonpregnant. They determined to study their cases roentgenologically. The five cases reported are illustrative of various types of ureteropelvic abnormalities (dilatation, stricture, etc.), which malformations were evidently of long standing. Some of these anomalies (e.g., marked dilatation of the entire excretory apparatus) were classed as congenital. Hence, the theories of ureteral compression, elongation, torsion, kinking, etc., due to the pregnant uterus, are, they believe, untenable; the compression theory, for example, fails to explain the pyelonephritis of early pregnancy.

The writers call attention to the fact that bacilluria without pyelitis or pyelonephritis is common in pregnancy, and they feel that the bacilluria so frequently found after the eighth month is usually dependent upon stasis in the cecum and ascending colon. When defective renal drainage complicates the picture, pyelonephritis results; otherwise, it does not develop. They do not presume to claim, on the basis of these preliminary observations, that preexisting anatomic malformations are constant in this condition but wish to call attention to their frequency.

E. L. KING.

VAGINAL EXAMINATION IN THE THIRD STAGE OF LABOR AS A GUIDE TO ITS MANAGEMENT*

A STUDY BASED ON ONE THOUSAND CASES

BY MORRIS LEFF, M.D., NEW YORK, N. Y.

THE third stage of labor has been the subject of a good deal of controversy since the days of Credé, Ahlfeld, Schultze and Duncan. Their opinions have been accepted and little knowledge has since been added.

The third stage of labor remains the most dangerous of the three and (according to DeLee) "more women die from accidents of the third stage than during the other two stages combined."

In order to determine what really takes place after the baby is born, I have been making vaginal examinations in the third stage of labor, and found that my observations are radically different from the accepted theories.

At present we are guided in the management of the third stage by indirect or external signs. That is, we determine when the placenta has separated by signs not directly referable to the placenta, but rather to the lower abdomen, uterus, or cord. These supposed signs do not indicate when the placenta actually separates but rather are phenomena that occur relatively long after the placenta has already separated.

By depending on these accepted signs, it has been assumed that it takes the placenta between ten and forty-five minutes to separate; and that it is therefore necessary to wait that length of time before attempting to express it.

By making a vaginal examination soon after the baby is born, I found that the placenta separates promptly after the baby leaves the uterus. I have observed this fact in over 2500 patients delivered in the last four years.

I present here a series of 1000 consecutive cases (exclusive of cesarean sections and placenta previa centralis) delivered between January 1, 1927, and July 1, 1928, in which vaginal examinations had been made to determine the separation of the placenta.

Table I gives the time of the delivery of the placenta. It shows that in 878 cases the placenta was delivered within five minutes after the birth of the child. In 98 cases within ten minutes, and in only 24 cases did it take more than ten minutes. In only 2 cases was manual removal of the placenta necessary. The average time for the delivery of the placenta in these 1000 cases was four and three-tenths minutes. The fact that these placentas had separated and were delivered in this short

*Read at a meeting of the Section of Obstetrics and Gynecology of the New York Academy of Medicine, Dec. 18, 1928.

period goes to disprove the accepted view that it takes between ten and forty-five minutes for the placenta to separate.

The retroplacental hematoma is given in most textbooks as a factor in causing the separation of the placenta. Some authors emphasize its importance and caution against disturbing it for fear of interfering with the proper separation of the placenta. I do not believe that the

TABLE I. TIME OF DELIVERY OF PLACENTA AFTER THE BIRTH OF CHILD

MINUTES	NO. OF CASES	
0	4	
2	190	
3	368	
4	133	
5	183	878
6	13	
7	41	
8	8	
9	3	
10	33	98
11	2	
12	4	
15	7	
17	2	
18	1	
20	2	
22	1	
25	1	
35	1	
65	1	Manual removal
85	1	Manual removal
90	1	24
	1000	

Average time four and three-tenths minutes.

retroplacental hematoma is a factor in the separation. It takes no part in the mechanism, but rather is produced as a result of the separation. The hematoma becomes larger the longer the placenta remains in the uterus, and prevents the uterus from contracting properly.

In the Duncan method of placental extrusion, it is evident that the hematoma cannot exert any influence in the separation, as the blood escapes through the cervix and vagina. On the other hand in the Schultze mechanism the blood is retained not because it is necessary for

TABLE II. BLEEDING BEFORE AND AFTER DELIVERY OF PLACENTA

DESIGNATION	OUNCES	NO. OF CASES
Very slight	0 - 3	134
Slight	3 - 6	578
Moderate	6 - 12	243
Considerable	12 - 20	41
Profuse	20 and over	4
		1000

the separation of the placenta but because it cannot get out, due to the obstruction at the cervix by the placenta. (Fig. 6.)

Table II shows that in 712 patients the bleeding was "very slight" or "slight" and was therefore so small in quantity that it could not have had any influence in the separation of the placenta.

That the retroplacental hematoma is neither desirable nor necessary is evident from the fact that in the larger animals, such as the mare and the cow, the placenta is expelled without any hematoma formation; in fact without any loss of blood at all.

Placental separation is due to the fact that after the baby leaves the uterus, the uterus contracts and is reduced in size. The placenta cannot accommodate itself to this reduction in size, it is therefore cast off from the uterine wall. This mechanism alone is sufficient to cause the

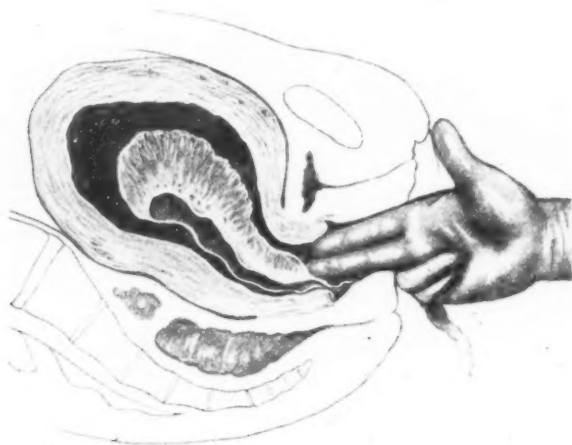


Fig. 1.—Vaginal examination to determine separation of the placenta. The placenta is separated, it lies loose in the uterus and cervix. Cervix is dilated. Placenta is ready to be expressed.

separation of the placenta. There is no need of the retroplacental hematoma to aid it in the separation, nor are there any other forces required to accomplish this.

The placenta cannot separate slowly, a small part at a time. For we know that when the placenta separates, bleeding occurs from the site of attachment, until the contractions and retractions control the hemorrhage. If the placenta separated a small part at a time, the uterus would have to contract correspondingly, in order to keep pace with the placenta, so that the contractions of the uterus would have to be in the form of a slow peristalsis. This does not happen. The uterus either contracts or relaxes as a whole and not in parts, so that the placenta comes away as a whole.

Furthermore, we know that "bleeding is from the placental site, which cannot retract until the placenta is completely detached"

(Polak). Therefore it takes about thirty minutes for the placenta to become separated and the uterus could not retract in the interval, the bleeding would have to continue, as there would be no way of controlling it until the placenta had completely separated. Fortunately the bleeding does not have to continue for any length of time, because the entire placenta separates promptly after the birth of the child.

Credé in 1861 claimed that the placenta separated in a few minutes and therefore he advised its early expression. Credé's opinion held sway until 1880, when Ahlfeld (supported by Dohrn) brought forth his view of noninterference or a "hands off" policy, and claimed that the expression of the placenta as advised by Credé caused more bleeding. He advised waiting for hours until the placenta came away by itself, in spite of the fact that in only 14 per cent of his cases did the placenta come out spontaneously. It is now conceded that such an attitude is

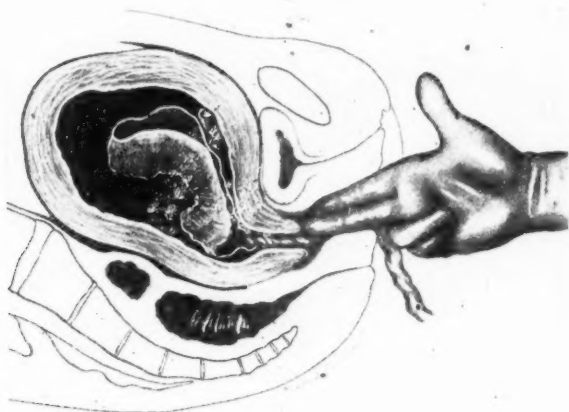


Fig. 2.—Vaginal examination shows cervix closed. Placenta cannot be delivered although it is separated.

both illogical and dangerous. Nevertheless it has had its influence in forming a sort of compromise between Credé's advice of early expression and Ahlfeld's policy of watchful waiting. But there is no more reason for waiting one-half hour before expressing the placenta than to wait several hours.

The reduction in the size of the uterus besides causing the separation of the placenta, forces it down into the lower uterine segment and cervix. The placenta can thereby easily be palpated by the examining fingers. In 80 to 90 per cent of the cases, the placenta is ready to be delivered without delay. But in 10 to 20 per cent of the cases when the uterus contracts, the cervix closes down and prevents the placenta from being expelled. (Fig. 2.) This closing down of the cervix prevents us from expressing the placenta routinely as soon as the baby is born. There is no way of knowing whether the cervix is open or

closed, except when vaginal examination is made. The cervix either closes down completely or partially, and it is then necessary to wait until it opens up again. It is useless to make any efforts at expressing the placenta until the cervix is sufficiently open to permit the placenta to pass through.

Another condition which occasionally causes some delay in expressing the placenta, occurs when part of the placenta is attached quite low, just above the cervix. The uterine contractions succeed in detaching the placenta; but that part of the membranes which is located just above the cervix remains attached. This fact can also be ascertained by the examining finger (Fig. 3), and the membranes can be detached while doing the examination. The placenta is then easily delivered.

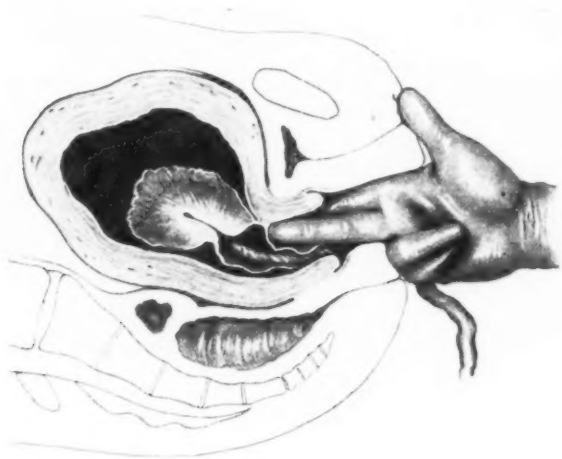


Fig. 3.—Vaginal examination discloses part of membrane attached, although the placenta and the rest of the membranes are separated.

The rare cases of pathologically adherent placenta are not considered in this discussion.

Before birth the placenta may be attached at any part of the uterus. When it separates and is forced down into the cervix it comes to lie in various positions. If situated on either side of the uterus, it naturally presents according to the method designated as the Duncan. Whereas if it had been centrally located, it will present itself according to the Schultze method. These two methods are only different forms of presentations, but there is no difference in the mechanism of separation in any case. Besides these two types in which the placenta presents after separation, it may present in a variety of forms, all depending upon its previous attachment. It is necessary to know where the placenta is located after separation in order to use the proper technic in expressing it.

Simple expression or the Credé maneuver will succeed in expressing a great many placentas but it will fail in quite a large number. Simple expression or Credé maneuver is quite applicable when the placenta presents according to the Schultze method. It is not applicable when the placenta lies either toward the right or left side of the uterus as in the Duncan method, or on the anterior or posterior wall. The Credé maneuver, in these cases, compresses the uterine cavity and interferes with the expulsion of the placenta. (Fig. 4.) For these presentations of the placenta, we must modify the technic so as to exert the pressure on that part of the uterus where we find the placenta located, and direct the force downward and toward the outlet (Fig. 5). When ex-

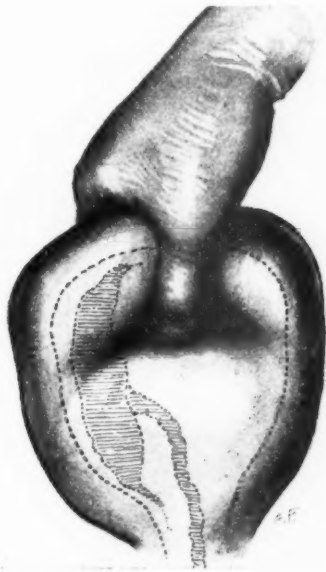


Fig. 4.—Ineffective Credé maneuver. The uterine cavity is compressed but as the placenta lies to one side, it cannot be expressed by this method.

pressing the placenta, the woman should be asked *not* to bear down but to relax; for if she attempts to bear down, the abdominal muscles become tense, and grasping the uterus is impossible. Full details how to express each individual placenta cannot be given. That knowledge is acquired when the vaginal examination is made and the placenta is felt. Depending upon where the placenta is found, the direction of the force is exerted accordingly.

One of the causes of failure in expressing the placenta is due to the uncertainty of whether the placenta has really separated. A half-hearted effort at expression is then made without success. However, by vaginal examination we know definitely whether the placenta is separated and when the cervix is open, we can attempt expression with full confidence that it is ready to be delivered.

The most important result of determining placental separation as soon as the baby is born and in delivering it promptly, is that it prevents unnecessary loss of blood. Table II shows the amount of blood lost in these 1000 cases. The "very slight," "slight" and "moderate," which total 95.5 per cent of the cases in this series, are all quantities that would be considered less than the normal blood loss in favorable cases.

The conservation of the patient's blood is the all important factor in the third stage of labor. Ahlfeld in conducting the third stage of labor by prolonged waiting had observed that a woman may lose 1500 c.c. of blood without any ill effects, though in other cases it proved fatal. He also showed cases that had lost 3000 c.c. of blood with com-



Fig. 5.—Technic of expressing placenta depending on its location. Pressure is made on that part of the uterus where the placenta is located.

paratively little disturbance. The fact that a woman in labor can tolerate an excessive loss of blood is no reason or excuse for permitting her to lose more blood than is absolutely necessary. We never know which patient will be unable to stand the loss. It is very fortunate that nature has provided a woman with the extra amount of blood so as to protect her in this dangerous period. In the evolution of the race those that were not so protected could not have survived. But that does not justify us in wasting the blood that she can use to good advantage during her postpartum period.

When the repair of the perineum is necessary, we should first deliver the placenta and make sure that the uterus is firmly contracted. Not only because the placenta in being delivered may tear the sutures, but

what is of greater importance is to prevent the uterus from filling up with blood while we are busy with the repair. If the repair is commenced before the placenta is expelled, it is essential that frequent attention be given to the separation of the placenta and to express it as soon as it is loose; for the time of separation of the placenta bears no relation to the time that it takes to repair the perineum. When the placenta is expelled and the uterus is well contracted, then we may safely proceed with any repair, without any uneasiness as to what may still happen when the placenta is delivered. While the first stage of labor may take days, and we need not interfere, and the second stage may be prolonged for hours and be of advantage to the patient, the minutes of the third stage are very precious and must not be wasted.

As the entire placenta separates at one time and the uterine bleeding comes from the placental site, therefore any bleeding coming from the

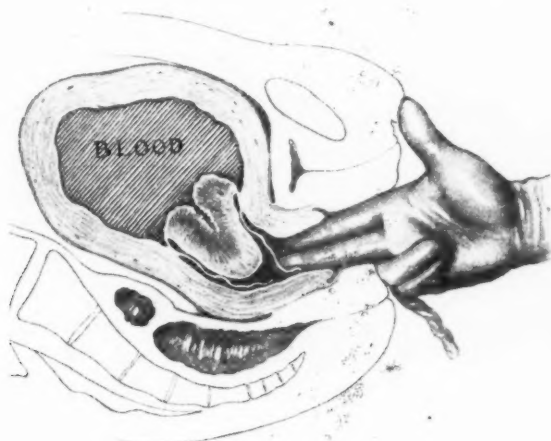


Fig. 6.—Vaginal examination shows placenta separated and presenting according to the Schultze method. The placenta obstructs the cervix, and blood accumulates in back of the placenta, without any external evidence of it.

uterus, irrespective of the quantity, may be taken as a sign that the placenta has separated. But the placenta may separate and not give any external evidences of bleeding (Fig. 6). In this series, 267 cases showed bleeding before the delivery of the placenta, while 733 gave no evidence of bleeding.

When thorough asepsis has been maintained during labor, there should be no hesitancy in doing vaginal examinations in the third stage. There are no ill effects from such examinations. The morbidity is reduced, and the patient recuperates sooner, because of the diminished loss of blood.

The procedure which I advocate for the third stage is as follows: As soon as the baby is born the nurse follows down the uterus with her hand. The baby is then cared for by tying the cord, treating the eyes and placing an identification tag on it.

A vaginal examination is then made (Fig. 1). With two fingers of the right hand in the vagina, the tips of the fingers feel the separated placenta lying loose in the cervix, or lower uterine segment. The cervix being open, the placenta is expressed with the left hand on the abdominal wall making pressure on the uterus in a manner indicated above. If desired the nurse can make this pressure on the uterus; and she continues to hold the uterus after the placenta is delivered.

If on examination the cervix is found to be closed (Fig. 2) nothing is done further until it relaxes. In that case examination has to be repeated to ascertain when the cervix opens up again, then the placenta is expressed in a similar manner.

One cubic centimeter of the pituitary extract is then given hypodermically, and two drams of ergot by mouth, and the third stage of labor is completed.

SUMMARY

1. The generally accepted signs of separation of the placenta are not dependable.
2. The only positive way of knowing when the placenta has separated and when it is time to express it, is by vaginal examination.
3. The placenta separates promptly after the birth of the child.
4. The retroplacental hematoma is not a factor in the separation of the placenta, but is the result of the placenta staying in the uterus after separation.
5. The cervix frequently closes down on the placenta. No attempt at expression should then be made until it opens up.
6. Besides the Schultze and Duncan mechanism, the placenta presents in various other positions, depending on where it had been situated when still attached.
7. Simple expression or Credé maneuver is not effective in a great number of cases. The technic of expression must depend on where the placenta is located after separation.
8. The repair of the perineum should be done after the placenta is delivered.
9. In the series of cases studied, the average time of the delivery of the placenta in 1000 cases was four and three-tenths minutes.
10. Because of the prompt expression of the placenta the uterus contracts sooner and firmer and bleeding is greatly diminished.

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15 EAST ONE HUNDRED ELEVENTH STREET.

QUININE REACTION FOLLOWING RECTAL ANALGESIA

BY GERALD W. GUSTAFSON, M.D., INDIANAPOLIS, IND.

(From the Department of Obstetrics of Indiana University Medical School)

NOW that rectal analgesia is an established and worthy aid in obstetrics, it seems only fitting that we should note any possible contraindication or indication for modification which may present itself.

Dr. Losee of the hospital laboratory at New York Lying-in Hospital has obtained quinine from the urine, by qualitative analysis, in 92 out of 100 patients who had had rectal analgesia.¹ However, in 5,800 cases having had rectal analgesia at that institution no quinine reaction was observed aside from some cases having the minor symptoms of ringing in the ears and deafness.

For the past four years I have been using rectal analgesia and have never encountered a case of severe quinine reaction until the one reported below. Neither have I been able to find a case reported in the literature.

G. F., a secundipara, was admitted to the Methodist Hospital February 19, 1929, in labor. She was referred to me by her family physician, who had been in attendance, because of prolonged labor. She had had a normal delivery five and one-half years previously. During the present pregnancy prenatal care had been given by her physician, who stated that she had been entirely normal throughout. Her pains had begun at 2:00 A.M. on February 19, 1929. At 3:15 P.M. on that date she was admitted to the hospital. She had had no medication previous to admittance.

Physical Examination.—The patient was a rather large woman and very apprehensive. Temperature 99.2°, pulse 90, respiration 22. Heart and lungs were normal. Blood pressure 142-40. Urine showed a faint trace of albumin, but no casts. Abdominal examination showed the ovoid to be longitudinal and the pregnancy at term, the fundus reaching almost to the xiphoid process. Palpation revealed the head fixed in the pelvis, the breech in the fundus, back on the right and extremities about the midline. Fetal heart 144, regular, and heard in the outer portion of the lower right quadrant. There was no edema. Pelvic measurements were normal: 24, 27, 30, 19, 8. After an enema and catheterization, rectal examination showed membranes intact, dilatation 8 cm., engagement 2 cm. above the

¹Harrar: AM. J. OBST. & GYNEC., 13: 486, 1927.

spines, position O.D.P. and no overriding of the head. Pains were of fair strength and coming at two- to three-minute intervals. Diagnosis: Pregnancy at term; position O.D.P.; no disproportion.

At 4:45 P.M. patient was given rectal analgesia, including 20 grains of quinine alkaloid. In a very few minutes she was much relieved and her contractions were not slowed. At 5:30 considerable bloody show was present and another rectal examination disclosed complete dilatation, membranes intact, position O.D.P. 135°, and the head at the level of the spines. Five minutes after the rectal examination the membranes ruptured spontaneously. The patient delivered spontaneously at 6:30 P.M. a 6 pound 14½ ounce boy in good condition. Third stage was entirely normal, lasting fifteen minutes.

The next morning the patient was entirely covered with a bright red erythematous rash and complained of intense itching all over her body. Her first question was whether or not she had been given any quinine, and she stated that the smallest dose of quinine caused her to have an identical rash with intense itching. Frequent soda baths and application of calamine lotion relieved her somewhat, but she insisted that the discomfort which she experienced for the following four or five days was worse than that of her labor. At the end of that time the rash gradually faded and the itching grew less. The babe's skin was always clear and both patients were discharged on March 5 in excellent condition.

COMMENT

Recently at the Wm. H. Coleman Hospital I delivered a colleague's wife, who gave a history of marked generalized edema, extensive skin rash and itching, following the administration of four grains of quinine sulphate by mouth. Having this history and the experience of the case reported, I gave the rectal analgesia omitting the quinine, with good results. According to Harrar¹ 30 cases were tried at New York Lying-in without quinine and some second stage delay was noted.

CONCLUSIONS

1. That quinine is absorbed when administered rectally in 20 gr. doses, is proved by clinical evidence.
2. A history of severe idiosyncrasy to quinine is a contraindication to rectal analgesia as generally employed.
3. In those rare cases of severe quinine idiosyncrasy, quinine should be omitted from the formula. Then rectal analgesia may be used with good results.

508 HUME MANSUR BUILDING.

Society Transactions

NEW YORK OBSTETRICAL SOCIETY

STATED MEETING, MAY 14, 1929

DR. W. J. DIECKMANN read a paper entitled **Further Observations on the Hepatic Lesion in Eclampsia**. (For original article, see page 757).

DISCUSSION

DR. JAMES EWING (by invitation).—The pathogenesis of eclampsia is by no means a new topic. In fact, ever since Juergens described the original lesion, in 1867, without a satisfactory explanation of its origin, there have been numerous attempts in many centers to unravel the various stages by which this peculiar hemorrhagic hepatitis develops. Attention has been directed strongly to the probability of a placental, uterine, or intestinal origin of a poison, and that theory still maintains its popularity.

About twenty years ago the literature was quite full of experimental efforts to produce the lesion of eclampsia, and in nearly all instances the experimenters succeeded in producing lesions in the liver which bore some resemblance to eclampsia, and in not a few of those cases they laid claim to a complete success. Many agents have been employed for this purpose of intestinal, placental, fetal, or uterine muscle origin. It has been shown that several extracts, injected into animals will damage the liver and produce lesions which have many of the features of eclampsia. However, I think the authors are to be congratulated in having taken into account one very important new point which most of the previous experimenters have omitted. They have drawn to their aid the known fact that there is an increase in fibrin content of the blood and have made that, I judge, a rallying point to develop their experimental work, and by the injection of agents which reduce the clotting time of the blood they have succeeded in producing the hepatic lesions. I cannot say that these lesions, so beautifully shown are not observed in eclampsia, especially the hemorrhages in the periphery of the lobule; that seems to be a very suspicious lesion. In some forms of toxemia of gestation the lesion begins in the intermediate zone, but that is not the rule. In some instances in these experiments the hemorrhage began in the intermediate zone. That fact does not at all militate against their theory, because both those types are observed in the toxemia of pregnancy and in some cases of eclampsia.

They further support the theory by drawing upon the idea of placental cell emboli. Here I would like to have heard a little more detailed estimate of the extent to which those emboli actually occur. I conceive that as being, as a rule, a minor event in the course of gestation. It is true that in practically all lungs, after labor, by very careful sections, you can find small numbers of placental cells. I have seen them, but they are not very numerous, not anything like a flooding of the pulmonary capillaries by placental cells. I do not believe that occurs, so I would be much better satisfied with the strength of the supporting hypothesis which the authors use, if we had a little better estimate of the extent to which those emboli occur. Yet it may increase the coagulability of the blood.

They bring out the idea that tissue juices are liberated when the lining placental cells break loose and that further reduces the coagulation time of the blood. Whether such erosions of the placental villi can account for the reduced clotting time of the blood of gestation is open to question. That is a new idea

to me, and it will require a little while before I can fully digest it. While both those hypotheses no doubt support the theory, I question whether either of them is adequate to account for the change in the clotting time of the blood.

It is generally believed that the reduced clotting time of the blood is due to the increased amount of fibrin produced by the liver, which has a peculiar physiologic function in gestation and which necessarily has nothing to do with placental emboli or the discharge of tissue secretions into the blood. It is not so much that the blood clotting time is reduced in eclampsia by some agent which renders the fibrin factors more active, but that there is an actual increase in the amount of fibrinogen thrown into the blood by hyperfunction of the liver. Therefore there is a little difficulty in explaining theories and linking them with the hypertension of gestation, which is an essential factor of the condition.

As to the identity of these lesions with those of human cases, I believe that they are justified in assuming that many of these lesions are reproduced in eclampsia, but whether the essential element in the eclamptic lesion is so reproduced I am unconvinced.

Many years ago I was extremely interested in this question of eclampsia. I never was able to reach any conclusion as to the mechanism of those little hemorrhages in the eclamptic liver until a case came in from the Lying-In Hospital, which had died after a single convulsion with a large cerebral hemorrhage, the symptoms having lasted only a few hours. In that liver there were the most exquisite lesions of eclampsia in a very early stage, and when the sections were cut I was astonished to find a lesion I had never seen before. The entire fine hepatic arterial system was thrombosed, the vessels stood out like hyaline pipe stems, the lumina were occluded, the portal system was entirely free from distention, but here were these hepatic arterioles, not hepatic veins, or portal veins, but hepatic arterioles, which were the seat of this very grave lesion which clearly accounted for the miliary hemorrhages. On careful staining it appeared that this lesion began with hyaline necrosis of the endothelial cells of the hepatic arterioles, soon followed by fusion of the muscle coats of the arterioles until both were a solid hyaline mass. I do not believe any lesion produced in the portal system will produce such infarcts. Farr may never have seen that lesion. I cut many livers before I saw it. Since then I have seen traces of it in the older and more complicated cases.

The existence of such a lesion as the primary factor in the liver is inconsistent, one must admit, with the theory of a portal toxin that would strike the portal veins instead of the hepatic arterioles. Moreover, the same hyaline necrosis of the small arterioles occurs in other portions of the body, and sometimes quite notably. I have seen them in the gastric mucosa, in the pia mater, and in the brain, so we must assume that there is a general condition, as well as a local hepatic lesion of this sort occurring in the disease.

So I am unwilling to accept the author's belief as to the pathogenesis of the lesion of eclampsia. If one assumes that this is a correct explanation of the hemorrhages then I think it is going to be very difficult to establish a theory of portal intoxication.

It seems to me that the liver lesion is the most marked, because this disease is essentially a disturbance in the hepatic functions. It occurs in all phases of toxemia of pregnancy but takes this particular form only in eclampsia when convulsions are added. Any theory of eclampsia must have some bearing upon the other phases of toxemia of pregnancy. The only theory which meets these requirements is the theory of a primary disturbance in the function and circulation of the liver, which in pernicious vomiting and in acute yellow atrophy leads to degeneration of the liver cells, inhibition of the urea-forming functions of the liver, disturbance

of circulation, sometimes in pernicious vomiting to zonal necrosis, but which only in eclampsia gives rise to this peculiar thrombosis of the hepatic arterioles.

Now, having done my duty as a critic, measuring our colleagues and friends up to the highest possible standards, which I am sure they appreciate more than useless compliments, I want to say in conclusion that I feel they should be congratulated in planning a sane, rather subtle and reasonable line of experimentation in studying the pathogenesis of this extremely important disease. I believe that this may be a contribution of importance. I would not be at all surprised if they have pointed out an essential factor in the disease, and that by further pursuing this line of work they may be able to throw more light upon the undoubted connection between the pregnant uterus, the fetus, and the lesions in the liver. It is in that direction apparently that the best prophylaxis and therapy have been obtained.

DR. OTTO SCHWARTZ (by invitation).—Professor Ewing has called attention to the fact that he has observed thrombosis in the hepatic artery in cases of eclampsia. I was well aware of this fact and have studied the pictures of one of Professor Ewing's cases in Kosmak's monograph on "The Toxemias of Pregnancy." That this is a frequent finding is in my opinion very questionable. In the first place if this were true we might expect arterial thrombosis in other organs of the body. This only happens in very unusual cases of the very severe type. Also the hepatic artery even in smaller branches has a comparatively thick wall and a comparatively small lumen. It seems to me that on account of the character of the tributaries of the portal vein, that is, their thinner walls with larger lumina, thrombosis followed by rupture and hemorrhage in the periphery of the lobule is more apt to occur there than in the hepatic arteries. One cannot entirely put aside the fact that by good prenatal care in the last months of pregnancy, chiefly the elimination of meat protein from the diet and good elimination of bowels, eclampsia seldom develops. In other words, the absorption of substances derived from meat protein are in greater concentration in the portal system than elsewhere and under the condition of pregnancy, if this concentration becomes marked, it may cause coagulation with subsequent hemorrhage and necrosis of the liver.

DR. DIECKMANN (closing).—Dr. Ewing spoke of the difficulty of finding chorionic villi in the lungs and the hyperinosemia which occurs in eclampsia. We believe that the increased fibrinogen in pregnancy is due at least in part to the stimulation produced by the setting free of tissue fibrinogen. The latter substance is extracellular and a small amount is freed whenever there is a breaking off of a villus. *In vitro* Mills has proved that the fibrin yield from a given plasma may be made to vary greatly by tissue extract addition, variations being noted up to 152 per cent above normal. Fibrinogen by mouth in doses of 3 c.c. (maximum concentration 1.5 per cent) on an empty stomach will within five minutes reduce the clotting time of the blood in the finger tip, 20 to 60 per cent. In many cases of eclampsia the coagulation time is very short, thus indicating why it is difficult in many cases to bleed them.

We believe that other factors are also concerned in eclampsia. For example, some substance or substances must be causing the capillary spasm and hypertension. These products may have their source in the placenta, in the intestinal tract or in a damaged liver.

A report by Copher and Dick of the "stream line" phenomena in the portal vein is of great interest to us. They show that there are three distinct and separate currents in the portal vein. Blood from the stomach, duodenum, and jejunum goes to the right lobe. In one case of human eclampsia we found that the lesion was limited almost entirely to the right lobe and in the experimental produc-

tion of the lesion by the oral route, whether we use tissue fibrinogen or meat, we find the most marked lesions in the right lobe, thus additional proof is furnished in support of the intestinal absorption theory.

We have also found that if we use a pressor substance such as tyramine, in conjunction with meat by mouth and fibrinogen intravenously, the lesion is more easily and quickly produced and is as a rule more extensive.

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF MARCH 7, 1929

DR. WILLIAM R. NICHOLSON reported a **Case of Simulated Uterine Rupture in an Aged Patient.**

This patient gave her age as seventy-three. Her relatives thought she was underestimating it somewhat. She was sent in to my service by Dr. Pfahler for diagnostic curettage, with the idea of a possible malignancy, as she had had slight vaginal bleeding recently. On examination an apparently senile uterus was found, with a tumor arising from the neighborhood of the right cornu. This tumor was about the size of an orange. Under the ribs on the right side there was another easily demonstrable tumor. No connection could be shown between this second tumor and the uterine growth. An anesthetic was given and the sound showed the cavity apparently about $1\frac{1}{2}$ inches deep. The dilator was introduced to this depth, followed by a curette. Dilatation not being quite sufficient, the dilators were again introduced, when to my surprise they slipped in up to the shoulder of the instrument instead of $1\frac{1}{2}$ inches. There was quite a little bleeding from the vagina within a few moments, and therefore upon the basis that there had probably been a perforation of the senile uterus, the abdomen was opened. There was no blood in the peritoneal cavity and investigation revealed no perforation. It was then clear what had happened. The uterus was not a small senile uterus, but was four inches in depth and in the fundus was a myoma which had grown up, elongating the tubes. From the top of this fundal tumor a pedicle ran to the other fibroid which was adherent under the ribs. This second tumor, adherent under the ribs, had angulated the uterus so that the whole body was pulled to the right, making a sharp angle of flexion. This angle had been straightened by the second introduction of the dilators. An hysterectomy was done, the tumor under the ribs being separated with some difficulty. The ovaries, which were adherent, were allowed to remain. On opening the uterus subsequently, it was found that there was a polyp just below the internal os, and that this was the cause of the vaginal bleeding. Fortunately, the patient recovered without symptoms.

DR. LEWIS C. SCHEFFEY reported an instance of **Carcinoma of the Cervix in a Woman Twenty-Two Years of Age.**

Mrs. A. H., aged twenty-two, was admitted to the Gynecological Service, Jefferson Hospital, on July 4, 1928, complaining of continuous, foul, bloody discharge, accompanied by the passage of tissue-like material from the vagina.

Four months prior to admission she had been delivered spontaneously of her third child, previous pregnancies and labors having occurred in 1925 and 1926. During this recent pregnancy, she frequently had pains in the side, together with periods of bleeding each month. Following delivery, she never ceased to have a

bloody discharge, and in June her family physician decided to perform a curettage, following a profuse hemorrhage. At this time he recognized a proliferative growth in the vaginal vault, and was quite emphatic in stating that he had observed nothing abnormal about the cervix and vagina at the time of delivery. He proceeded no further and referred the patient to the hospital for further study and treatment.

The past history was uneventful, although the patient reported a leucorrhœal discharge since the first labor in 1925. There had, however, been no abnormality of menstruation or irregular bleeding prior to the onset of the recent pregnancy.

The patient presented a toxic, somewhat emaciated appearance, and examination showed the cervix to be obliterated and replaced by a friable, bleeding, cauliflower-like growth, club-shaped, extending two-thirds of the distance to the vaginal orifice, and markedly distending the vagina. It was partially fixed and appreciably tender, clinically a Class III carcinoma. The fundus was palpable and movable, the adnexa not being distinguishable. A portion of tissue was readily removed for histologic study, Dr. C. J. Bucher reporting squamous cell carcinoma. The Wassermann was negative, the blood count showing a pronounced secondary anemia and leucocytosis (Hgb. 47; R. B. C. 2,480,000; W. B. C. 14,000; C. I. P. 97). The urine was negative. Intermittent fever was present, and the sedimentation test vertical in type, complete settling occurring in thirty-five minutes.

A few days later (July 9, 1928), under nitrous oxide and oxygen anesthesia, I excised this large carcinomatous mass and cauterized the base, 125 mg. of radium being implanted into the remnant of the cervical canal and around the periphery of the growth for thirty-six hours. Very little reaction was observed and the patient left the hospital in ten days.

I have seen this patient upon two occasions since then, her most recent visit to the Clinic occurring during the past month. Locally the cervical area shows the usual postadium appearance, all slough having disappeared. Moderate pericervical induration is present, the fundus being normal in size and freely movable. Vaginal discharge is negligible, and no bleeding has occurred since the radium application. A striking feature has been the marked gain in weight, in part attributable to the effect of the radium dosage on the ovaries, I presume. Her general condition appeared to be splendid. The future aspect of the patient is problematical of course, and we are observing her with more than usual interest.

DISCUSSION

DR. C. C. NORRIS.—In a series of over 4,000 cases recently reviewed there was not one under twenty years of age, nor have I ever seen so young a patient.

A point of interest in Dr. Scheffey's case is that it was first observed during the puerperal period. At this time and during pregnancy extensive erosions often exhibit some of the characteristics of malignancy. Biopsy is a valuable aid in the diagnosis of all really early carcinomas, and especially so in this type of case. In Dr. Scheffey's case there is no question of the correctness of the diagnosis, and it seems to be either a transitional or squamous cell type.

As to Dr. Nicholson's inquiry regarding the dosage of radium irradiation for these cases, it varies in the hands of different operators. About 2,400 mg. hours is the minimum, and in some clinics much higher dosages are employed. In Stages I, II, and III, I usually employ not less than 2,400, or more than 3,200 mg. hours at the first treatment, and generally give such cases a second, and in some instances, a third irradiation. I govern the dosage after the initial treatment by the conditions surrounding the individual case.

DR. JOHN C. HIRST presented an **Analysis of Eighty-Four Consecutive Cesarean Sections**. (For original article, see page 773.)

DISCUSSION

DR. F. E. KELLER.—In comparing one's own statistics with those offered, there are many points that should be considered. The manner in which I have done certain things differs diametrically from that stressed by Dr. Hirst, such as the preliminary dosage of morphine and the use of local anesthesia. Under these conditions we have done the vast majority of our operations. Also, we have not considered the disadvantage of preliminary vaginal examination; of course, the majority of our cases are in our own care preceding operation which has a good deal to do with it.

We are interested in the question of mortality and the hours of labor before cesarean section was performed. I appreciate the fact that many of these cases come from sources where it is impossible to regulate the hours of labor before section is performed, but it does seem that if these cases could have been seen earlier, the probability is that his mortality would have been greatly reduced. From some points of view, there are too many cesarean sections done, but when I personally consider some of the cases in which the vaginal delivery has been difficult, and where a vaginal operation has been necessary for delivery, with consequent mutilation of the child and mother, I feel that in some of them it would have been better for the mother and far better for the child if cesarean section had been done.

DR. P. F. WILLIAMS.—I would like to ask about the table showing the mortality in the emergency group of cases, as to the mortality comparison between the Beck and the classical operation.

DR. LONGAKER.—In view of what has been said, the matter of diagnosis of impending rupture and actual rupture following a prior cesarean section has great importance. I have seen three ruptures following cesarean sections and if this point is remembered, the diagnosis of impending and actual ruptures is easy, i.e., exquisite tenderness on gentle palpitation.

In our experience and that of my associate, Dr. Harriman, the greatest amount of satisfaction in our operative work has been derived by following the suggestions of Dr. Pitkin's paper read here a few months ago. The operative and postoperative results and especially the comparative bloodlessness of the operation have been in striking contrast with anything we have ever experienced before in a long number of years and amounting to over 125 cases.

One point I think deserves emphasis: I believe we fall down more frequently in the proper treatment of cases of cervical dystocia than anything else. These are the cases, often long drawn out with unfavorable results to the baby and, when ultimately operated upon, with bad operative results. What we seem to need is a clear definition of the indications for operative delivery in cervical dystocia.

DR. WM. R. NICHOLSON.—I would like to go on record as stating that there was no marked sensitiveness in my cases of secondary rupture following cesarean section, and that the diagnosis was far from easy. This is in direct contradiction of the statement made by Dr. Longaker.

DR. SCHUMANN.—I do not condemn spinal anesthesia. I am in favor of any anesthesia other than inhalation; if any physician wishes to go to the extra trouble of subjecting his patient to spinal anesthesia, that is his own concern. We have found cocaine perfectly efficient.

I do not agree with Dr. Longaker on the matter of his ability to diagnose imminent rupture by the exquisite tenderness. I have seen three such cases and in all three the woman was symptomless and a careful palpation of the abdomen in order to determine the position elicited no pain and yet the uterus was widely ruptured without labor.

DR. CHAS. S. BARNES.—I would like to add that in our case the almost symptomless condition was similar to that in Dr. Nicholson's; the symptoms were very slight and it was only because the pulse had increased in rapidity that we operated.

DR. BERNARD MANN.—Several years ago at the suggestion of Dr. B. C. Hirst, I began the suturing with the endometrium and a subperitoneal suture followed by a running Lambert suture of the peritoneal covering of the uterus, and there was much less distention of the abdomen and most of the cesarean sections were almost afebrile. I have recently used this method of suturing in a case of eclampsia with very good results.

DR. HIRST (closing).—Dr. Piper is modest about his special suture which is a decided advantage over the method which had been in use in the University Maternity up until four or five years ago. There is undoubtedly less fever and less distention following it, and it leaves the uterus low instead of up around the umbilicus, as sometimes occurs after careless suturing of the uterus. I agree with Dr. Keller's remarks about the advantages of morphine with local anesthesia. However, morphine given with nitrous oxide or ether, has a bad effect on the baby. As to the length of labor, we allow no patient to have a longer test than twelve to fourteen hours with the first baby and two or three hours shorter test after the first child, but of course many patients in this group were admitted with the history of much longer labor prior to admission.

I am unable to answer Dr. Williams' question as to the division of mortality according to the Beck operation or the other types of procedure.

Answering Dr. Nicholson's questions as to whether we believe in the dictum: "Once a cesarean, always a cesarean," I would say that cases operated upon for dystocia invariably should have a section with the next child. If cesareanized for premature separation, placenta previa, etc., then, other things being equal, it is not dangerous to allow a short test of labor for the next child, provided the patient be in a hospital.

DR. E. A. SCHUMANN read a paper entitled **Further Observations Upon Hydatidiform Mole.** (For original article, see page 768.)

DISCUSSION

DR. WM. R. NICHOLSON.—I recently saw a case in which curettement in a supposed incomplete abortion showed the presence of a hydatid mole. At the first operation the hemorrhage was so profuse that the assistant who performed it packed the uterus. A week later the woman still bled freely enough to warrant a second packing. The subsequent history of this case was a gradual increase in anemia, with slight spotting. Two blood transfusions were given and the ovaries exposed twice to x-rays. Finally, consent to radical operation was obtained. Upon opening the abdomen it was found that we were dealing with a marked bicornuate uterus, the one horn being as large as a large adult first, the second being practically normal size for an unimpregnated uterus. Dense adhesions between the uterus and sigmoid were present. Supravaginal hysterectomy was performed. The pathologist reported the presence of syncytioma in the fundus of the pregnant uterus and two perforations in the wall, which he believed to be due to the malignant process

present. The woman died of apparent peritonitis. No postmortem was permitted. It is to be remembered that this condition is comparable, in so far as vigorous curettage is concerned, with placenta accreta, and therefore that rupture of the uterus is very possible.

DR. CLIFFORD B. LULL.—I would like to report a case which I thought was one of abortion but which proved to be a large hydatiform mole. Under anesthesia I examined the interior of the uterus and could find no trace of mole. I believe, too, that if you have a patient with hydatiform mole, the most logical thing is to open the uterus as there is always the possibility of malignancy. Our patient made a good recovery, and we informed her of the possibilities of further difficulties. She had one normal menstrual period after discharge from the hospital and two weeks later had continual flow of blood from the uterus. On examination the uterus was unquestionably larger than it should be, and we were uncertain as to whether subinvolution or malignancy was the cause. I advised hysterectomy or if not that, to allow an exploratory. She refused to have anything done.

DR. C. C. NORRIS.—My experience in the histologic diagnosis of curettings is in general similar to that of Dr. Schumann.

The histologic diagnosis of chorionepithelioma is in many cases impossible, except in the type referred to by Ewing as choriocarcinoma. In this connection I believe that many uteri have been sacrificed due to an incorrect diagnosis. When the pathologist is in doubt he should so report to the surgeon. In the case of doubt the surgeon is in a better position to make a decision than is the pathologist. I do not think the fact that even the experienced pathologist is not always able to arrive at a positive histologic diagnosis in these cases is generally recognized.

DR. SCHUMANN (closing).—I would simply like to emphasize the statement that diagnosis of potential malignancy is impossible from microscopic examination. The reason I so strongly advocate hysterotomy is that the primary mortality from hemorrhage and sepsis is less. It is true that in skilled hands it is possible to manually remove a mole without mortality in a number of cases, but then four or five patients will come along who are poor surgical risks and a high mortality rate follows, which could have been avoided by employing abdominal hysterotomy.

Furthermore, I am coming to believe that chorionepithelioma is a rare disease. Recently Dr. Macfarland, who is now making a survey of all cases in the Pathological Department said he had yet failed to find more than one case of chorionepithelioma. At the Jefferson Hospital I noted but two or three and Dr. Bland reported one recently. Symmers, reporting over a period of eighteen years at the Bellevue Hospital, says: "This disease, which we all regard as rather common, is exceedingly rare."

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Selected Abstracts

Pregnancy and Disease

Hofbauer, J.: Contributions to the Etiology of Pyelitis in Pregnancy. Bull. Johns Hopkins Hosp. 42: 118, 1928.

The author summarizes his study as follows: Urinary obstruction in pregnant women is caused by certain anatomic conditions in the juxtavesical portion of the ureter and in the trigonum vesicae.

Hypertrophic changes in the musculature associated with hyperplastic changes in the connective tissue are essential factors in the narrowing of the lumen of the lower part of the pelvic portion of the ureter. The constriction is still further accentuated by an encircling ring resulting from hypertrophy of the ureteral sheath, while engorgement of the vessels in the mucosa and dextrorotation of the uterus may act as contributory factors.

There was no demonstrable indication of an active inflammatory process or of remnants of a preceding inflammation in the ureteral wall in the specimens examined.

A moderate degree of hydroureter is a common occurrence in pregnant women. The distal end of the ureteral dilatation usually lies at the level of the parametrium, the visible dilatation being associated with a demonstrable delay in ureteric action. The hyperplastic and hypertrophic changes in the upper pelvic portion and in the abdominal portion of the ureter are decidedly less marked, and the dilatation above the narrowed area of the juxtavesical portion occurs as a consequence of the structural peculiarities described in the article.

The hypertrophy of the trigonum accounts for the clinical phenomenon of residual urine in pregnant women.

In seven out of 55 cases a definite lowering of the opsonic index of the serum toward *B. coli* during pregnancy could be demonstrated. The bearing of these findings on the development of actual pyelitis is discussed.

While there occurs after labor a gradual return of the renal pelvis and of the ureter toward normal in uncomplicated cases, persistence both of bacteria and of marked dilatation of the ureter was demonstrable on reexamination in a considerable percentage of women who had been treated for pyelitis during a preceding pregnancy. In the majority of these cases, the level above which the ureter has remained dilated corresponds to the parametrium. Stricture of the ureter may occasionally result from long-standing infection in the ureteral wall during pregnancy.

The inadequacy of the present therapeutic measures calls for radical changes in the treatment of pyelitis complicating pregnancy. The use of pituitary extract is suggested on account of its specific antiphlogistic action, as well as for its stimulating effect upon ureteric peristalsis.

C. O. MALAND.

Frigyesi, J.: *Pregnancy and Gallstone Disease.* Med. Klin. 23: 1844 and 1926, 1927.

Pregnancy plays an important rôle in the formation of gallstones. In Mayo's 3075 cases of gallstones in women, 90 per cent had borne children and in 90 per cent of them the first symptoms of their trouble began during pregnancy or immediately afterward. The first condition necessary for the production of gallstones is stasis of bile, which is usually due to mechanical influences. Pressure by the uterus is not a factor but infection is considered by some writers to be an important cause. Westphal believes the cause of the stasis of bile is neither mechanical nor inflammatory but is a motility neurosis of the bile tracts which arises from an increased tonus of the vagus. Cholesteremia is considered to be an important factor in the production of gallstones but this point is not settled. It is true, however, that the cholesterin content of the blood serum increases during pregnancy and decreases during the puerperium.

The treatment of gallstones during pregnancy is the same as that in the non-pregnant state. The therapy should be conservative and an attempt should be made to influence the irritability of the vagus system and for this purpose antispasmodics such as atropine should be used. Scopolamine and morphine also give relief from the pain. To avoid stasis, exercise is prescribed and the diet is regulated. Heat applied locally, olive oil, pituitrin and magnesium sulphate may help. Medical treatment usually suffices, for in the author's series of 30 cases, operation was necessary only twice. In this series 63 per cent were multiparas.

J. P. GREENHILL.

Mann, F. C., and Higgins, G. M.: *Effect of Pregnancy on the Emptying of the Gall Bladder.* Arch. Surg. 15: 552, 1927.

About two years ago Boyden made the important observation that a meal of egg yolk and cream caused the gall bladder of a cat to empty. This observation has been the basis of much recent, very important work on the physiology of the biliary tract. Mann and Higgins studied dogs in various stages of pregnancy. Similar studies were made on gophers and guinea pigs. Control studies were made on nonpregnant animals.

Mann and Higgins summarize their experiments as follows: Their observations show that the gall bladder of the pregnant dog, guinea pig, and gopher usually does not entirely empty following a feeding of egg yolk and cream, while in the nonpregnant animal it usually partially or completely empties. Partial emptying was noted in early stages of pregnancy, and in a few dogs it was noted late in pregnancy. However, in no instance in the large number of animals observed did the gall bladder of a pregnant animal of these three species empty in the time and to the degree that it emptied in the nonpregnant animal. The gall bladder of one pregnant cat emptied in the same manner as that of a nonpregnant cat. A large number of pregnant cats and pregnant animals of other species must be examined before it can be accepted as a general physiologic fact that the gall bladder of the pregnant animal does not empty in a similar manner following the ingestion of the standard fat meal as it does in the nonpregnant animal. However, sufficient data have been secured in regard to three species to make it appear probable that similar observations will be made with other species, including man.

The results of these experiments cannot be applied to the human being without qualification. However, three considerations are pertinent to the subject. The pathologic conditions often associated with pregnancy which may directly or indirectly have some relation to the mechanism of the biliary tract are: (1) hyperemesis, (2) eclampsia, and (3) gallstones. Further observations with particular reference to the normal mechanism of the biliary tract must be made before definite conclusions can be reached.

M. G. SEELIG.

D'Amato, G., and Gmelin, E.: The Effect of Pregnancy and Puerperium Upon the Galltract. *Zentralbl. f. Gynäk.* 51: 1031, 1928.

A large number of healthy pregnant and early puerperal women were examined with the duodenal tube. The obtained duodenal contents were examined chemically, bacteriologically and microscopically and were found not to differ at all from specimens gained from nonpregnant women. Cholecystography was also done in a number of healthy pregnancies. All gall bladders were visible, a considerable displacement to the right could be observed in the last months of pregnancy. Five puerperae with complaints suggestive of gall bladder involvement were examined, in two the shadow was very faint, in the three others no trace of a shadow was visible, considered to be due to a spastic condition of the ducts or a swelling of their mucosa. Gallstones were not seen in any of the cases. The investigators feel that cholecystography can be employed with success during pregnancy. In healthy pregnant and puerperal women the findings resemble those of the nonpregnant.

GROVER LIESE.

Brindeau, A., and Juge, C.: Surgical Interventions During Pregnancy. *Gynéc. et Obst.* 14: 10, 1926.

The legitimacy of surgical intervention during pregnancy is no longer questioned. It is admitted by all that the dangers formerly anticipated do not exist. In 113 women operated upon during pregnancy at the Tarnier clinic, 110 cures, were obtained with a mortality of 2.55 per cent. Of the operated women, 45 went to term without complications, 53 continued their pregnancy with no further data on their delivery, and 13 had interruption of the pregnancy following operations. The operations were done for the following conditions; ovarian cyst, 45; fibroma, 18; appendicitis, 18; salpingitis, 11; various operations, 21. In general, an operation is not more difficult in the pregnant woman, though there is more vascularity in the region of the genitalia. In 2 cases there occurred phlegmasia alba dolens. The anesthesia of choice should be chloroform or ether. Spinal anesthesia is contraindicated because of the danger of exciting contractions. Morphine should be given after operation every six hours. A definitely indicated operation should never be omitted because of the pregnancy.

GOODRICH S. SCHAUFFLER.

Fairbairn, John S.: Acute Abdominal Emergencies Complicating Pregnancy and the Puerperium. *British M. J.* 1: 456, 1927.

The author attempts to point out the difficulties that are encountered in diagnosing acute abdominal conditions that arise during pregnancy and the puerperium. The chief symptoms are vomiting, abdominal distention, jaundice, and abdominal pain.

When the vomitus is of a coffee ground type, progressing toward fecal type, associated with distention of the abdomen, and occurring after the fifth month without toxic signs the cause may well be other than pregnancy.

When jaundice is present, gall bladder disease must be differentiated from toxemia with liver damage. Toxemia with hepatitis is usually accompanied by abuminuria and severe vomiting. Epigastric pain is present in both.

Abdominal pain is associated with many conditions, the most important of which are intrauterine pregnancy with retained hemorrhage, spontaneous rupture of pregnant uterus, tubal pregnancy with rupture or leakage of blood, strangulation of ovarian cyst by torsion of pedicle, peritonitis (unusual from an infected tube), appendicitis, pyelitis or pyelonephritis of pregnancy.

Abdominal distention is usually from ileus and more frequently in patients who have had previous abdominal surgery with resultant adhesions causing strangulation.

Appendicitis late in pregnancy is found to be more dangerous because of the

high position of the appendix. Late diagnosis is frequent, as the pain is mistaken for labor. In appendicitis fetal movements are painful and there is unusually low temperature and disproportionately high pulse. The treatment is the same as in nonpregnant cases, except that expectant treatment is to be considered less strongly than in nonpregnant. The prognosis is graver because of the danger of abortion or premature labor after operation.

ADAIR-GRIMES.

Jerlov, E.: Appendicitis During Pregnancy and the Puerperium. *Acta obst. et gynec. Scandinav.* 4: Supplement, 1925.

The author studied in 21 hospitals and in the private practice of three physicians the case histories of patients who had appendicitis during pregnancy or the puerperium. There were altogether 456 such cases, of which 390 occurred during pregnancy and 66 during the puerperium. Most of the former cases appeared during the early months of pregnancy and two-thirds of the patients were under thirty years of age. Appendicitis in the puerperium was purely accidental. Since appendicitis occurred in only 1.3 per cent of all pregnant women, it must be concluded that pregnancy does not tend to increase the susceptibility to appendicitis. Appendicitis is definitely more frequent among nonpregnant women.

In mild cases of appendicitis, during pregnancy and the puerperium, tenderness is localized at McBurney's point, but in severe cases the tenderness extends through the lower right quadrant. The temperature is often low. It is important to rule out pyelitis, but often cystopyelitis occurs with appendicitis during pregnancy. Other pathologic conditions to be considered are acute salpingo-oophoritis, extra-uterine pregnancy, twisted ovarian cyst, cholecystitis, and cholelithiasis.

Pregnancy does not tend to cause a recurrence of an old appendicitis. In cases of appendicitis with peritonitis pregnancy has a bad influence. Labor does not affect mild cases but aggravates the cases complicated by purulent peritonitis when it precedes operation. When, on the other hand, operation precedes labor, the results are definitely better. In the mild cases of appendicitis, operated on during pregnancy, abortions occurred in only 13 per cent. In the severe cases the incidence of abortion was between 70 and 80 per cent. This was due to the purulent peritonitis which was present. In 19.2 per cent of the latter cases salpingo-oophoritis occurred.

The total maternal mortality among 263 cases was 9.5 per cent. Among the 167 mild cases there was no death but among the 96 severe cases the mortality was 26 per cent; hence the mortality of the mild cases in pregnancy is no greater than in nonpregnant individuals. In the case of an abscess, however, the mortality is higher in the pregnant than in the nonpregnant individual. The cases of diffuse peritonitis in pregnant women, on the other hand, do not have a worse prognosis than in the nonpregnant. The cases where abortion occurred had a high mortality, hence abortion is a bad prognostic sign. By the same token there is no indication to open the uterus before performing an appendectomy during pregnancy. There is no indication to perform a hysterectomy in the cases complicated by peritonitis. In all mild cases immediate operation should be performed but the uterus should not be evacuated. If the uterus is emptied before operation, the prognosis is much worse than if the uterus is emptied after operation. The uterus should not be emptied routinely after delivery. The best results will be obtained by waiting for a spontaneous delivery.

J. P. GREENHILL.

Wilson, Robert A.: Acute Appendicitis Complicating Pregnancy, Labor and the Puerperium. *Surg. Gynec. Obst.* 45: 620, 1927.

It is known that about 2 per cent of women with acute appendicitis are pregnant. About 80 per cent of the cases occur in the first six months, the disease being com-

paratively rare in the last trimester. It undoubtedly is more common in the puerperium than is generally supposed, but is frequently overlooked at this time. Pregnancy reacts unfavorably on a diseased appendix. It always aggravates the existing pathology and is likely to precipitate an acute attack at any time. Primary attacks during pregnancy are quite rare. The disease runs a rapid course, and perforation and peritonitis may be present in a few hours. This is especially true in the late months of pregnancy. The diagnosis becomes increasingly difficult after the sixth month, this being especially true if uterine contractions are present. The leucocyte count does not furnish much aid because of the leucocytosis normally existing during pregnancy. In case of doubt, operation should be performed. The maternal prognosis is good if an early operation is performed, but following perforation a mortality rate of 50 per cent is to be expected. In simple cases there is little danger of abortion, but if perforation is present, the uterus will empty itself in at least 50 per cent of the cases. The more advanced the pregnancy the greater is the danger to mother and child. Whenever possible, the appendix should be removed during laparotomies performed for other conditions. When the organ is known to be diseased, it should be removed before pregnancy occurs, and, if a pregnancy is already present, at the first appearance of symptoms. It is in the last trimester that several important problems have to be dealt with, and in order to meet these, cesarean section, followed by appendectomy, is advocated as the procedure which will give the best results. The method to employ in emptying the uterus depends on the extent to which the uterine wall is involved in the infectious process. When this is slight, the classical operation is indicated, but, if severe, a choice must be made between a low section or the Porro operation.

WILLIAM C. HENSKE.

Portes and Seguy: The Influence of Pregnancy, Labor, and Puerperium on Acute Appendicitis. Therapeutic Results. *Gynéc. et Obst.* 15: 114, 1927.

Pregnancy does not particularly predispose to appendicitis but appears to play an important rôle in the determination of exacerbations of previous chronic appendicitis. There seems to be a marked tendency to development of diffuse peritonitis of a serious nature, especially during labor, when the uterine contractions traumatize the cecoappendicular region, breaking protective adhesions and freeing infective elements. Nine previously unpublished cases are reported.

In view of the frequent exacerbations caused by gestation it is wise to operate before marriage upon every woman who has previously shown definite symptoms of appendicitis. In general, the mode of action should be approximately that which would be used if the pregnancy were not present. Intervention during appendicitis complicated by plastic peritonitis or abscess, definitely endangers the pregnancy (40 per cent of 38 patients miscarried). Under these conditions it is better to wait if possible; or if interference is necessary, to simply drain for the time being. In diffuse peritonitis, the only chance to save the mother is by immediate intervention. Hysterectomy has been suggested in order to facilitate drainage but this seems extremely radical. If operation is indicated during labor it should be performed.

GOODRICH C. SCHAUFLER.

Pewsner: Appendicitis and Pregnancy. *Russian Clinics*, p. 559, 1926.

Pregnancy is an important factor in the aggravation if not primary origin of appendicitis. During pregnancy the process often is difficult of recognition, the symptoms mild, while in the puerperium the disease more quickly reveals itself in its true form. Appendicitis may interfere with the normal progress of pregnancy and cause its premature interruption, and is likely to complicate labor and especially the puerperium. If one acknowledges that every diagnosed appendicitis justifies operation, one will have to admit that in pregnancy even only suspicion of such a

condition indicates surgical interference. The dangers are so definite, that earlier in pregnancy, if the patient should definitely refuse appendectomy, the interruption of pregnancy must be considered justified.

AUTHOR'S ABSTRACT.

Heyer, E.: Inflammation of the Adnexa During Pregnancy. *Monatschr. f. Geburtsh. u. Gynäk.* 76: 243, 1927.

There are in literature, reports of 35 cases of purulent inflammation of the adnexa complicating pregnancy. In cases where these two conditions occur, the infection (1) may have occurred before conception, (2) it may have taken place during conception, or, (3) after conception. As regards the first possibility, in unilateral acute cases, pregnancy is possible. In cases of previous bilateral chronic inflammation, impregnation is possible because the tubes possess an extraordinary power of restitution. In fact, in chronic cases, pregnancy is the ideal method of cure because stasis and hyperemia are the chief aims in treatment of chronic inflammation. There is no proof that old chronic cases are lighted up by pregnancy. A case which has not completely run its course may be made worse by pregnancy.

Infection during conception is not uncommon where gonorrhea is present. The occurrence of infection after conception is doubted by most authors. Hence the coincidence of adnexal inflammation and pregnancy occurs chiefly in cases where there has been a unilateral subacute infection before conception. Of the 35 cases reported in the literature there were careful notes in 24 instances, and in 18 the infection was one-sided. The author reports an additional case.

The diagnosis is often difficult. As long as there is no pus present, conservative treatment is instituted just as in nonpregnant individuals. Where pus appears, surgical interference is indicated without delay and especially by laparotomy. Among the reported cases there was a mortality of 30.4 per cent for the patients who were operated upon and a mortality of 100 per cent for those not operated. All the patients who were operated upon before perforation of an abscess, recovered.

J. P. GREENHILL.

Placintianu, G.: Myomectomy During the Puerperal State. *Rev. franç. de gynéc. et d'obst.* 22: 421, 1927.

The author reports a series of 56 cases in which myomectomy was performed by various operators during pregnancy and in 41 cases the latter continued after the operation. He also reports five cases in which myomectomy was done after emptying the uterus by cesarean section and four cases in which this operation was resorted to during the puerperium. His conclusions are as follows: Surgical intervention is seldom necessary during pregnancy and when indicated, myomectomy can frequently be done in the early months of gestation without interfering with the further evolution of the ovum. During the latter months of pregnancy, operation is rarely necessary. During labor the chief indication is a fibroid blocking the pelvis and enucleation can be performed after cesarean section. During the puerperium, an operation may be made imperative because of hemorrhage and pain. A hysterectomy is to be performed at the end of pregnancy if there are multiple fibroids, or incarcerated ones, during labor if the tumors are multiple and during the puerperium if infection is feared.

J. P. GREENHILL.

Vandescal, R.: Myomectomy During Pregnancy. *British M. J.* 2: 793, 1928.

In general myomectomy during pregnancy is contraindicated because it leaves a weak scar in the uterine wall.

Myomectomy is permissible in the following conditions: (1) When the fibroid is large and diagnosed early (before third month) and when the tumor can be dif-

ferentiated from the uterus. (2) At any time when necrobiosis of the tumor is demonstrable by such symptoms as pain, softening of the tumor or peritoneal irritation. (3) When there is a torsion of the pedicle with peritoneal irritation. (4) When there is a retroversion due to the tumor and (5) when pressure by tumor leads to hydronephrosis, venous stasis, etc.

The following technic is advised for operations: (1) General anesthesia is preferable. (2) Decapsulate the tumor by an incision around its summit and not around the base. (3) Stop all bleeding carefully. (4) Use no drainage. (5) Give morphine in large doses.

In following the above conditions the clinic has had 1.9 per cent maternal and 13.0 per cent fetal mortality.

ADAIR-HESDORFER.

Gaudier, H., and Bournoville, L.: Escape of Liquor Amnii During a Myomectomy on a Four Months' Pregnant Uterus. Continuation of Pregnancy Until the Seventh Month. Bull. Soc. d'obst. et de gynec. 16: 516, 1927.

A thirty-nine year old primipara complained of severe abdominal pain. Bimanual examination revealed a fibroid uterus the size of a four months' pregnancy. A laparotomy was performed and a pregnant uterus with large myomas found. Two large myomas were removed and when the second one was enucleated the bag of waters was unintentionally ruptured. A fetal small part presented itself in the wound, and before it was closed, practically all the amniotic fluid had escaped. The patient was given opium and made an uneventful recovery. Before discharge from the hospital there was noticed a return of liquor amnii in the uterus. The patient had a premature labor in the seventh month but the child died during labor. There was no evidence of a scar in the membranes.

J. P. GREENHILL.

P. Nubiola, and V. Carulla: Intraabdominal Curie-therapy in Cancer of the Cervix and Pregnancy. Rev. espan. de obst. y ginec. 11: 1, 1926.

The authors report the case of a woman at term treated by abdominal cesarean, extensive hysterectomy, and the placing, via the abdominal route, of four tubes, each containing 6.50 mg. of radium, in the regions most involved by the cancerous process. In this way 22 millieuries were administered in 120 hours, combined with a dosage of 18.8 millieuries applied in nine days through the vagina. Deep roentgen radiation was used as a complementary treatment. The result was good for six months of postoperative observation.

Superficial radium treatment of cervical cancer is indicated in pregnancy where the fetus is not yet viable, but deep treatment may cause abortion. X-ray treatment is contraindicated during pregnancy. When the fetus is viable operative treatment should precede radium therapy, as otherwise peritoneal infection may follow operation. In such cases the widest possible hysterectomy should be done in order to facilitate the application and action of radium, which, as the above case shows, is well tolerated and is most effective if applied intraabdominally. Subsequently x-ray treatment should be used against possible recurrence.

THOS. R. GOETHALS.

Schockaert: Cervical Cancer and Pregnancy. Bruxelles-med. 7: 15, 1926.

Schockaert believes that cancer of the cervix complicated by pregnancy is rare because the majority of cervical cancers appear during the fourth decade of life, at which time pregnancy is less apt to occur. While the malignant growth may originate in a uterus already pregnant, the author believes that the reverse is the more common occurrence. The treatment of these cases depends upon whether or

not the malignancy is operable. In the first instance only the life of the mother should be taken into consideration. When, however, metastases have developed, the tumor should be treated conservatively in an effort to carry the fetus past the point of viability. Schockaert feels that irradiation of these cases would almost invariably cause abortion.

The case of a woman thirty years of age is reported. At the time she was first seen the pregnancy had advanced to two and one-half months. She gave a history of a watery, foul smelling discharge for a longer period, so in all probability the malignancy antedated the pregnancy. A radical Wertheim with resection of the iliac glands was done. Sufficient time had not elapsed to state the ultimate outcome.

THEODORE W. ADAMS.

Karg, C.: Pregnancy After and in the Presence of Cancer of the Uterus. *Monatschr. f. Geburtsh. u. Gynäk.* 78: 264, 1928.

The author collected from the literature six cases in which pregnancy followed the occurrence of carcinoma of the cervix. All of the patients were treated by radiation and in three cases spontaneous delivery afterward took place. He found two additional cases of pregnancy occurring after carcinoma of the vulva. All of the children born were entirely normal, hence, the author agrees with Schmitt, Nürnberger and others that children born after a period of amenorrhea produced by radium or roentgen rays show no defects. The author also collected from the literature ten cases where pregnancy occurred in the presence of carcinoma of the uterus and he adds two cases. All of the patients were treated with radium. In nine cases there was a spontaneous delivery, in one a vaginal cesarean section and in two instances an abortion. All the children born were normal. The author believes that cancer of the uterus during pregnancy should be treated with radium because it not only preserves the life of the mother as well as operation but also saves the life of the baby.

J. P. GREENHILL.

Roy: A Few Cases of Cervico-Uterine Epithelioma in Pregnant Women Treated With Radium. *Bullet. Soc. d'obst. et de gynéc.* 17: 653, 1928.

The author reports four cases of carcinoma of the cervix encountered during pregnancy. Three of the patients were treated with radium during the latter months of pregnancy and the fourth received treatment one month after a cesarean section was performed. Three patients were delivered by cesarean section and one had a spontaneous delivery at the seventh month. Two patients died, one was in good health two years after delivery and one was in good health one month after cesarean section. One child died in utero, one was in good health at two years of age, one was normal at fifteen days and the last appeared normal at one month of age.

J. P. GREENHILL.

Item

An American Board of Obstetrics and Gynecology

A BRIEF RÉSUMÉ OF THE PROGRESS MADE TO OCTOBER 1, 1929, IN ITS CREATION AND ORGANIZATION

I. At the meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held in Asheville, N. C., September 15 to 17, 1927, Dr. Walter T. Dannreuther of New York introduced a preamble and resolution providing for the appointment of a committee on standardization of requirements for specialists in obstetrics and gynecology, and suggesting the appointment of a similar committee by the American Gynecological Society. The primary function of this committee was to consider ways and means for the organization of an American Board of Obstetrics and Gynecology. This resolution was reported on favorably by the Council and unanimously adopted. Dr. John O. Polak, President, appointed the following committee:

Dr. Walter T. Dannreuther,	New York, Chairman
Dr. Louis E. Phaneuf,	Boston
Dr. Arthur H. Bill,	Cleveland
Dr. Frederick H. Falls,	Chicago
Dr. Grandison D. Royston,	St. Louis

II. A communication was sent from the American Association of Obstetricians, Gynecologists and Abdominal Surgeons to the American Gynecological Society suggesting the appointment of a committee by the latter organization to cooperate and act jointly with the existing committee. The American Gynecological Society, at its next meeting in May, 1928, named:

Dr. Jennings C. Litzenberg,	Minneapolis, Chairman
Dr. Louis Baer,	Chicago
Dr. Herbert M. Little,	Montreal
Dr. Edmond D. Piper,	Philadelphia
Dr. Edward A. Schumann,	Philadelphia

III. A meeting of the committee representing the American Association of Obstetricians, Gynecologists and Abdominal Surgeons was held just prior to the Association's meeting in Toronto, September 10 to 12, 1928. Dr. Litzenberg was present by invitation and participated in the discussions and formulation of a plan for the organization of an American Board of Obstetrics and Gynecology. This plan provided for the appointment for five years of nine examiners, three to be appointed by the American Association of Obstetricians, Gynecologists and Abdominal Surgeons; three by the American Gynecological Society, and three by the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association. The Committee's formal report included a brief statement of the purposes of the Board, the general requirements for all applicants and the classification of applicants. It provided for the examination of voluntary candidates and the issuance of certificates to the successful applicants and expressed the hope that all well-established gynecologists and obstetricians will apply for the certificate of the Board.

A recommendation was made that a copy of the report be forwarded to the American Gynecological Society and another to the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association with a request that a committee be appointed by the American Medical Association Section to cooperate with the two existing committees.

IV. After the meeting of the American Gynecological Society in May, 1929, Dr. Litzenberg wrote to the Chairman of the Committee of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons stating that the American Gynecological Society was willing to cooperate in any plan feasible for the principle proposed in the original resolution.

V. Dr. Walter T. Dannreuther of New York introduced a preamble and resolution at the meeting of the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association at its meeting in Portland, Oregon, in July, 1929, committing the Section to participate in the organization of an American Board of Obstetrics and Gynecology. The resolution was adopted and the newly elected Chairman of the Section was authorized to appoint a committee of three to cooperate with the two existing committees.

VI. At the meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held in Memphis, Tenn., September 16 to 18, 1929, the Committee on Standardization of Requirements for Specialists in Obstetrics and Gynecology filed a report referring to the following important items:

- a. Reprinting of the Committee's 1928 report in the *Journal of the American Medical Association*, November 24, 1928.
- b. Favorable editorial comment on the project in the *Journal of the American Medical Association*, January 5, 1929.
- c. Pertinent editorial articles in the *New York Medical Weekly*, February 23, 1929, and the *New England Medical Journal*, February 2, 1929.
- d. Comments of Dr. Harry R. Trick, President of the Medical Society of the State of New York in his report to the House of Delegates.
- e. Memorization of the Board of Regents of the State of New York by the House of Delegates that some action be taken for the legal certification of specialists.
- f. The recent organization of the British College of Obstetrics and Gynecology.
- g. The receipt of several applications for the certificates of the Board.
- h. Recommendations that three fellows of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons be elected to serve as representatives and examiners on the American Board of Obstetrics and Gynecology.

VII. The American Association of Obstetricians, Gynecologists and Abdominal Surgeons thereupon elected Dr. Walter T. Dannreuther of New York, N. Y., Dr. Paul Titus, Pittsburgh, and Dr. Grandison D. Royston, St. Louis, to serve for five years as its representatives and examiners on the American Board of Obstetrics and Gynecology.

VIII. As soon as the American Gynecological Society and the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association each elect their three representatives and examiners the Board can be organized and begin to function.

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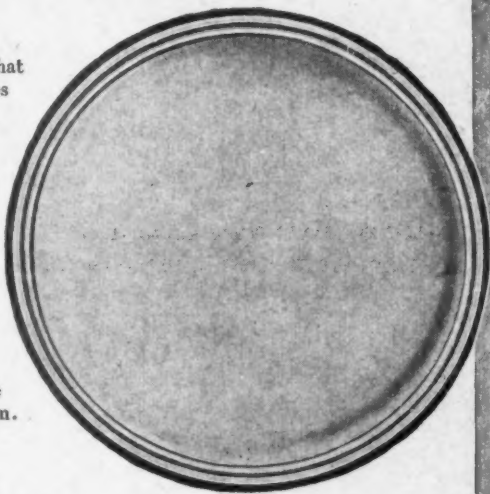
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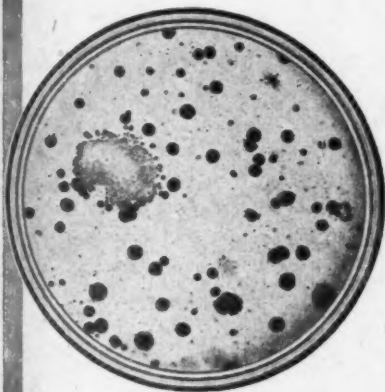
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